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THE AUTOMOBILE MAGAZINE

JULY, 1901

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VOLUME III NUMBER 7

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THE AUTOMOBILE MAGAZINE

VOL. III JULY, 1901 No. 7

Automobile Club's Show at Agricultural Hall, London

By LOUIS J. OATES

PROBABLY many of our readers are already familiar with the fact that from May 4 to 11 there was held in Agricultural Hall, London, the annual show of the Automobile Club of Great Britain and Ireland.

The promoters of this show are to be congratulated upon the success attending their enterprise. The number and variety of exhibits exceeded those of any previous exhibition by just one-half, and must have convinced the most rabid opponent of automobilism that the motor car is now firmly established and means to stay.

I do not propose, in this article, to deal exhaustively with the different stands, but simply to mention what, in my opinion, were the principal features of the show.

In the first place, the Agricultural Hall is well adapted for an exhibition of this nature, and the enclosure set apart for the exercise of cars answered its purpose admirably. The directorate had very wisely limited the number of cars allowed at the same time in the exercise ground to four, and this enabled the vehicles to be driven at a fair speed, and also showed the spectators the quick turns which can be made in any direction, and the celerity with which they can be brought to a standstill. This part of the show was also brightened by the number of ladies who unconcernedly went round on the different cars, as if motoring was an every-day feature of their existence. Could George Stephenson have appeared upon the scene he would

have been not a little startled at the rapid and extraordinary advance in locomotion which has taken place since his prosaic days.

To turn to the exhibits, I was most impressed with the stand of the Daimler Motor Company, Coventry and London. The center piece of attraction was the eighteen horse-power Daimler tonneau, and there was also a phaeton of similar horse-power built by the company, but lent to them for exhibition by the Managing Director of the Clipper Tire Company, Limited.

The Daimler tonneau has the rear seats arranged each in semi-circular form, with arm rests for the passengers. It is driven by a four-cylinder eighteen horse-power Daimler motor, with the latest form of valves and roller bearings. Ball thrust bearings are fitted throughout. There are two brakes, and the car runs on artillery wheels shod with large section pneumatic tires. Mr. Percy Richardson, the ever courteous London manager, informed me that photos of this particular car had not been taken as yet, but he was good enough to provide me with photos of the two cars which the company recently supplied to His Majesty King Edward VII.

I append a few details of these cars which will, no doubt, be interesting to readers of the AUTOMOBILE MAGAZINE.

The Daimler Wagonette is fitted with a twelve horse-power four-cylinder Daimler motor with all latest improvements. Both wheel and screw steering gear, 40 inches by 3½ inches (90 m/m) pneumatic tires to back wheels, and 34 inches by 3½ inches (90 m/m) tires to front wheels. Axles and springs are designed to keep carriage low; compensating sprocket brakes and countershaft pulley brake, foot accelerator, side lever controlling gear, improved geared water pumps, pressure lubrication, aluminum gear box and engine base, front and back radiator, planished steel engine cover. The frame is painted lead color.

The wagonette will seat four persons behind and two in front. Leather wings, floorcloth to footboards, rubber mats, cushions and back rests upholstered in leather, pair plaited carriage lamps and signal horn.

The Daimler twelve horse-power break will carry fourteen passengers and driver. It has paneled sides to seat with half spindles, and with top rails to form back rests, and with square ends at back. It has four speeds of 3, 6, 9 and 12 miles per hour, and any of the same may be used in reverse. I understand the price of the two cars was $10,000.

Another exhibit of the Daimler Company was a Coventry wagonette to carry six and a nine horse-power Marseilles tonneau phaeton with comfortable accommodations for four persons. Altogether the Daimler Company had a very interesting display.

The principal exhibit of the New Orleans Company consisted of a seven horse-power two-cylinder light carriage which did wonders in the hill-climbing trials of the Automobile Club.

The De Dion-Bouton Company had five "De Dion" voiturettes of various types, also a phaeton with detachable canopy and plate glass screen.

Daimler Car. Owned by Edward VII.

The Motor Power Company was particularly noticeable for its famous sixteen horse-power four-cylinder Napier cars. Other cars of smaller proportions were also shown, and this stand had many admirers.

At stand No. 18 was the Sirene voiturette, built by E. W. Hart. This had a very pretty appearance. Its principal advantages are its light weight, splendid hill-climbing capacity, attainable high speed, and small consumption of petroleum. Further, the suppression of water cooling, thus preventing all trouble of pump seizing, and deranging, fracturing of pipes, etc. It has three speeds forward,

and one reverse. The speeds are 5, 8 and 12 miles per hour, but by the aid of the sparking arrangement the speed may be increased from 25 to 30 miles per hour on average roads. The motor is placed in front of the voiturette, and thus insures a facility for inspecting the mechanism. The weight is about eight hundred pounds.

The Locomobile Company of America had about a dozen cars on exhibition, ranging in price from $800 to $1,500. Their main exhibit was a car recently purchased by the London County Council for the use of the Metropolitan Fire Brigade, upon the recommendation of the chief officer, Commander Wells, R. N.

The Swift Cycle Company had a Swift motor tricycle, a Swift motor quad., and two voiturettes. The motor tricycle came in for a good deal of attention from the general public.

With regard to automobilism for heavy traffic, I was much struck with the one and only exhibit of Bayley's, Ltd., in the Minor Hall. This was a steam trolley, made to carry a load of four tons. The boiler is arranged in front of the driver, with bunkers for the coal around the front and sides. Price, $3,000.

France was represented here by Jurgan & Foy, of Rue Carnot, Paris. Their principal exhibit was a steam-traveling omnibus, luxuriously fitted up. It is called the "Quo Vadis," and will be remembered as having recently toured in Paris and Algiers. It has electric light and elaborate cooking arrangements. Anyone wishing to travel say, from the Cape to Cairo should invest in this class of car. There seems nothing wanting except a printing press with which to chronicle ones doings *en route*. Certainly one would suffer no discomfort to live in this traveling caravan for six weeks at a stretch.

Panhard & Levassor showed two cars similar to the one they recently supplied to the leader of the House of Commons. The principal exhibit of the Singer Cycle Company was their motor bicycle, and this attracted a fair amount of notice. The motor is placed on the back wheel, except in the case of machines built for the fair sex, where the motor is applied to the front wheel. As this type of machine was often running in the arena, people visiting the show received a liberal education in bicycling without effort, so to speak. The machine is light and is deservedly popular.

Of stands devoted to motor accessories there were many ; perhaps the most interesting being the exhibits of the Salisbury of Blackfriars, S. E. Lamps of every conceivable description were to be seen here suitable for either oil or electricity. During the week a minor acci-

dent occurred which might have had serious consequences. A small gasoline car took fire in the yard outside where a good many of the cars were stationed, and it was utterly demolished; the owners of other cars naturally viewed the fire with uneasiness, and it was lucky the incident ended there. On Friday many distinguished visitors put in an appearance at the show. The Rt. Hon. A. J. Balfour, M. P., and his brother, Mr. Gerald Balfour, M. P., were to be seen in the arena trying a car, similar, I believe, to the one recently supplied to

Daimler Break. Owned by Edward VII.

the Queen. The closing days of the exposition seemed to attract more people, and certainly the show increased in interest. One can only describe it as a great success, and likely to influence many who before had never taken motoring seriously. It would be interesting to learn the value of the whole of the exhibits during the week. Surely they would amount to a stupendous total. Anyhow, the Automobile Club's exhibition has left its mark.

Automobiles for the Medical Fraternity*

I BELIEVE I have read nearly everything which has been written on this subject. The conclusion I have drawn from same is to the effect that the writers were all either too rich or not sufficiently practical, or unversed in mechanics. One declares that he can only use a motor costing 7,000 francs, which, with a mechanician at a yearly salary of 2,000 francs, costs him at the rate of 5,800 francs per year ; the other, with a modest tricycle, finds occasion for an outlay of 20 francs a month to replace lost pins and screws. At the present price of iron this is a mere bagatelle.

I wish in this article to point out the *desiderata* for medical use, founded on an experience of five years. Some other time I shall give figures which will demonstrate that the automobile, in the hands of a careful man, is not the expensive article they would have us believe. I made my debut in 1895 with a large five-seated motor (Roger Benz), and a few months later bought the first tricycle made by the Dion-Bouton house. I next became the owner of a two-seated Benz motor, then another Dion tricycle with a drag. In reality, my stable is comprised as follows : an ordinary bicycle, a petroleum bicycle (Werner), a Dion tricycle, and a three-seated voiturette (G. Richard). I live in a mountainous country, where are very steep grades ; the petroleum bicycle answers for cross-roads, in paths inaccessible for other vehicles, and renders me signal service in these particular cases. I use the tricycle for short trips of from one to two kilometers, or when I have need to travel rapidly in spite of steep grades. I employ my motor for the longest routes.

As each person's necessities differ, according to the locality, he must choose his vehicles in relation to his requirements ; so, to my thinking, this is what is needed for doctors : A voiturette, costing not more than 4,000 francs, at most ; weight 400 kilograms maximum, two large seats and a flap-seat ; medium width of frame, sufficiently high, motor in front, 4 horse-power, tonneau body, three gears, one of which is very low, making it possible to pass everywhere—snow, mud and steep hills in bad condition—no water-circulation, compound

*A recent issue of *L'Avenir de L'Automobile et du Cycle* furnishes a practical and interesting article—taken from *Les Petites Annales*—by Dr. Zaliski, on the automobile, as applied to the purposes and necessities of physicians, which I herewith translate for the readers of the AUTOMOBILE MAGAZINE.—A. LENALIE.

system of igniting, transmission by belts, and no chain drives; also no pneumatic tires; a large hood without window lights and emergency brake. It is with this voiturette that one becomes least fatigued and suffers least from rain and cold; and it is always well to be accompanied by someone, in case of requiring remedies in haste. By means of the flap-seat, too, *monsieur*, *madame and bébeé* can be accommodated on their pleasure drives of a Sunday, if Sundays there be for physicians.

If the doctor makes his calls alone, the voiturette must be easily movable to the hand in changing directions, backwards and forwards, turning or passing to one side; the weight should not exceed 400 kg. maximum. In outlying districts it is indispensable that the frame should be rather high, otherwise sinking into a rut your muffler will scrape the ground, or even the more delicate attachments are liable to receive injury.

Motor in front, easily accessible, especially in everything relating to the plugs, the trembler and the exhaust valve which is the most fragile of all.

No water circulation. If you are called to an emergency case in the winter, at night, and you are obliged to remain with your patient several hours without leaving you run chances of finding your cylinder casing even broken and the whole circulation destroyed when you return.

Compound system of ignition. As everything in a doctor's profession moves by fits and starts, he should be able to leave at any instant without stopping to look after the state of his batteries or accumulators.

Transmission by belts and direct gear. This is the most facile method, which wears the voiturettes least and brings the minimum of strain to bear on a complicated mechanism. To-day they manufacture belts of leather prepared with chromic acid, which are absolutely insensible to thermometric and hygrometric variations.

No pneumatic tires. I am not inimical to these, on the contrary, I always have thirteen wheels with pneumatic tires by me, ready to use. But I am obliged to reckon on possible punctures; and, with these, though your carriage and yourself are carried with more ease, yet you must leave a half hour sooner than you otherwise would, to be sure of arriving in time; but though you start with well-blown-up tires, you find them flat as a sole when you are ready to return; but, again, when the weather is inclement, you are completely

drenched in making the necessary repairs or lose something, which may cost you a hundred francs or so to replace ; but, you tear your nails and the flesh of your fingers ; but, you swear ; *but* . . . where art thou, O, L'Aiglon.

A large, long canopy, a good boot and especially no windows. In case of accidents it is dangerous, the sun strikes through them, the rain blurs them outside, the dust and mud stick to them and you cannot see through them.

An emergency brake is indispensable. Often one is signaled to stop suddenly on a grade, and all the brakes do not hold fast at the rear. In fine, a model motor fulfills nearly all these conditions, but I am not permitted to name it, as that would be an advertisement, so *chut !* it is forbidden.

It will perhaps interest our readers to know that there is now a first-class automobile establishment in Plainfield, N. J., where steam, gasoline and electric automobiles can be purchased, stored, cleaned and repaired. The New Jersey Motor Carriage Company have started business with $30,000 capital and have fitted up a large store on Fourth Street, near the railroad station, where they have a fine line of automobiles of all makes. They have just installed a complete individual charging station capable of supplying current for the largest electric carriage, and as this station is an important link in the chain of stations to and from New York, Newark, the Oranges, Summit, Morristown, and all the Northern New Jersey towns with the stations toward Philadelphia, and along the New Jersey coast summer resorts, it will doubtless be of interest to our readers to know that such a station is already installed. In addition to the charging plant there is also a large air compressor where air is on tap at 150 pounds pressure for all who need it, and it will be found very convenient for inflating heavy vehicle tires, filling air tanks on steam machines and for any other purpose where compressed air is required. Gasoline of any hydrometer test can be had on the premises.

Automobile Races at Point Breeze, Philadelphia

THERE seems to be but little disposition on the part of the public to turn out in very large numbers to witness automobile races. Judging by the meager attendance at the race meet held at Point Breeze Track, Philadelphia, on Decoration Day, promoters of such things, in the neighborhood of the Quaker City at least, will not find the business remunerative.

Messrs. J. K. and J. S. Clarke and P. L. Neal Ready for Five Mile Race for Gasoline Machines

Perhaps the long spell of wet weather preceding Decoration Day had dampened the spirits of automobile enthusiasts. Be that as it may, the attendance was but small although the newspapers had announced the meet for some time before it came off. The day was ideal, although the track was in a deplorable condition as a result of the wet season immediately preceding May 30th.

What was to have been the star event never came off, as the actor and his apparatus were both "not there." Mr. Pen-

nington who, with his war automobile, was scheduled to favor the spectators with a mile-a-minute exhibition, was sick and unable to be there. This caused considerable disappointment, as this item on the program had been looked forward to by a great many. While there were five events down on the program, only four were run off. The first race was for gasoline machines, one Duryea and two Autocars. P. L. Neal drove the Duryea while J. K. Clarke and J. S. Clarke operated the Autocars. Dr. Clark also entered with an Autocar. Just after starting, however, the latter machine, for some reason would not move, and was practically out of the race. The race was won by J. K. Clarke, his time being 11.47.2. The winner managed to take the lead from the beginning and kept the Duryea machine following up, as it was not possible for it to pass, the track on either side being treacherous. It was purely a case of follow the leader, the man who got the lead being easily able to keep it.

The race for steam vehicles was won by J. A. Wells, in a Howard carriage. He competed against two Locomobiles. Time, 15.53.4.

In the second race for gasoline machines, Duryea's three-wheeler beat an Autocar. The time for the five miles for the Duryea car was 10.45.4. On the last lap this carriage covered the mile in 2.2. Considering the track this was a good performance.

The next event was a race between a Duryea and an Autocar. The former carriage, driven by P. L. Neal, won easily, the Autocar having to withdraw after making one lap, something having gone wrong with the works. When the machine arrived back at the starting place the driver discovered that it was lack of sufficient gasoline that had caused this trouble. Neal, of course, had it all his own way. The time was 12.8.2.

The promoters of the races were anything but satisfied with the result of their efforts and were disappointed at the response of the public. It is the old story—people are not going to buy automobiles for racing purposes. Endurance tests show something. Races, as conducted at Point Breeze and many other places, do not signify much. Then again, the matter of classification seems to be carried a little too far. They are all automobiles, whether propelled by steam, gasoline or electricity. Their objects are practically the same, and that being so, they should be tried as self-propelled carriages, and not as electric, gasoline or steam carriages.

Lemuel's Struggle With The New Carriage

"SAY, paw! what are these there automobelly things I jis read of in ther 'Post'—some kinder new bote, er what?"

"Give it up, Cynthia, mebbe 'tis. I dunno, anyhow; we'll ask Johnny when he comes up next week. Gosh, but we'll be glad ter see John ergain, won't we. Hasn't been hum in nigh on tew year."

"Mus' been gettin' good pay tew buy a kerridge, Lemuel. Said he'd send it up this week so'st be here when he cum. Better take Maud S. down termorrer in the demmykrat and bring it hum sost'l be reddy fer him. P'raps I'll go daown tew and get that alpacky I saw las' week."

Thus spake the venerable parents of the home-coming John Jarvis, who had gone "down to York" to make a fortune several years previous, and who had written of his return the week before. John was a good sort of a chap and had won a fair position in the city, with its attendant remuneration. Now he was coming home for a little visit to see the folks and townspeople in general.

The next morning saw Lemuel and Cynthia in the democrat driving the namesake of the famous trotter to the Dunmore station.

"Has that kerridge cum fer my boy Johnny, yet? Said he'd sent one and it orter be here 'bout now."

"Yes, Mr. Jarvis, came this morning, and you'll find it in the freight house. I'll help you get it out bimeby, if you want. Better look it over first," and he winked at the by-standers.

Mr. Jarvis went down as briskly as seventy-year-old legs with rheumatic joints could carry him. Then he stepped to the door and called:

"Cynthy, Cynthy, hitch that ere mare and cum here. Funnist lookin' kerridge I ever saw. See all them handles." Cynthia had arrived by this time, "an' this ere brake wheel. What th' blazes dye 'spose they're for."

Then he walked around it again, growing more bewildered and exasperated at every turn.

"Either Johnny's gettin' funny notions about kerridges, er else they cheated him. Nary a shaft nor a coupler to put 'em in. Howd's he calkerlate to hitch in the horse, I want ter know. Cynthia, that boy's

gone plum crazy, but I 'spose we've got ter get the thing home somehow."

"An' see ther wheels—rubber tires and wire spokes; 'n where's ther fifth wheel; how'd they turn ther wheels anyhow. See all the wheels underneath, too. Mebbe it's a new fangled thrashing masheen he's trying to s'prise us with, callin' it a kerridge. Well, here goes for home," and he gave it a push towards the door. Just then the station agent appeared.

"You go back up your horse, Mr. Jarvis, and we'll run it out of the house."

So Maud S. was backed up, and Lemuel prepared to lash the new vehicle fast, and get it home somehow.

"Back up here, Maudie! Ho there; ho, ho, there. Hold him there, Cynthia, 'n I'll lash her fast. Don't know where ter tie 'cept the ax', but that'll do. There now, Maudie, git up, and see how she goes."

"Maudie" took a few steps; took up the slack and stopped. Pulled kinder hard, and she wasn't expecting it. Then she started again, and the caravan moved slowly along, mother Jarvis driving, and Lemuel walking to see how things went. All went well till the corner was reached and Maudie turned toward home. But the thrashing machine didn't. Kept on in a straight line, or tried to, and Maudie decided to stop once more.

"Jumpin' Jehosaphat, how'm I goin' to get this darned thing home anyhow. Johnny's no son of mine if he put this up here tew play a joke on his old dad. Pulls like a locomotive—must weigh a ton. Now, how can I turn those danged wheels anyhow, sos't steer the thing."

"Try them handles, Lemuel, p'raps they do sumthin'. Johnny always did like a lot of machinery, you know," piped up the dutiful Cynthia, and Lemuel climbed into the carriage, and grabbed the brake wheel. The wheels moved as he turned, much to the dismay of Mrs. Jarvis, whose warning shout of "Stop paw, you're twisting the wheels of the ax'! Both wheels seem to be loose. Oh, dear! I wisht I was hum, an' that John had his ol' freight car down in York."

"Naw thain't nether, Cynthia. They'se got nimbal jints down there. They be all right, an' if you'll jes chirrup to Maudie a little we'll see how she navigates. Steddy there, now we're doin' it."

Father Jarvis soon mastered the navigation of his queer craft and, though Maud S. worked harder than she had for months, she finally reached home with the tandem vehicles, and the new one was properly

backed "into place." John came the next day and heard of the trials and tribulations of his father from the station master as soon as he landed. Hurrying home, he was met with "Johnny, what kind of a vehicle is thot you sent up here. Pretty nigh killed the ol' mare, to say nothin' of yer ma an' me gettin' the dum thing home. Ef yer ma hadn't er thot an' told me ter try an' steer with them handles she wouldn't er been hum yet. But, say Johnny, she does steer kinder well after you know how. Wisht I could fix my demmycrat that way. But where's yer shafts?"

"Never mind shafts, father, don't need 'em. Got any gasoline in the house. Well, if you'll get me about a gallon while I go and see ma I'll show you how she goes. Don't need any horse with that."

"Don't need a horse. Why, say, Johnny, is that there thing one of those automobeeleys I've heard of. No; don't say so. Why, I'd never dared drug that thing hum fer fear 'twould go up an' me tew." But Johnny had gone, been welcomed by his mother, and was returning with her just as pa Jarvis came on the scene with the gasoline. It didn't take long to fill his tank, oil around and start the motor.

"Climb in mother and father. Now we'll ride as is ride," but both demurred, so he drove it slowly around the yard, and finally induced them to get aboard, too. It didn't take long to get them into the spirit of the thing, and now both Lemuel and Cynthia can talk automobile as well as anything else, and they often laugh at their experience in taking Johnny's machine home.

An item has been going the rounds of the automobile press to the effect that a Copenhagen chemist had discovered a process for manufacturing, out of asphalt, a material called "solicium," which serves as a substitute for rubber. Consul Freeman, who is stationed at the city named, has written to say that he has been deluged with letters from America asking for particulars regarding this discovery. He adds that no such process has been patented or discovered. It is true a chemist named Steenstrup has patented a process for making solicium from old rubber and oil, but its efficiency as a substitute for rubber has yet to be demonstrated.

A Touring Carriage

IT was our privilege and pleasure to be present recently on the trial run of the car which is illustrated herewith. The vehicle was built by the Automobile Company of America, on special order for the Automobile Touring Company of America. It is painted Julian red, black trimming, and called "Red Rover." It has three seats and rumble. Three persons can be comfortably accommodated on each of the seats, they being ample in width. As will be seen, the

"Red Rover" in Central Park

wheel base is unusually long, nine feet and a half. The frame work is of a most substantial character, and one cannot ride in the car without a feeling that below is great strength. The wheels are similar to those carried on the "Gasmobile," made by the same company, and are equipped with Diamond tires.

The engine is placed between the rear seat and rumble. It is one of the standard pattern "Gasmobile" 12 horse-power engines, but with a little larger bore and stroke. The power is transmitted to the driving axle by means of chains and sprockets, one on either side.

The brakes carried are very efficient indeed, as was clearly demonstrated several times during the trial run referred to. Semi-elliptic springs are carried at front and rear, and the ease of riding is very noticeable. She runs smoothly, and for a machine of such dimensions, with very little noise indeed. On the trial spin an average speed of 12 miles per hour was maintained, carrying a paying load of 1,753 pounds.

All those who participated in the initial run were highly pleased at the performance. The run was from the city to Travers Island, thence to New Rochelle and Mamaroneck, then across to White Plains ; a total of 65 miles. No trouble at all was experienced.

This wagonette is running almost daily from the Waldorf-Astoria to various interesting points around New York.

That the vehicle is popular is evidenced by the fact that the car is booked for almost every day. One trip will be made along the shore of Long Island Sound, a second along the east bank of the Hudson River and a third over the roads of Long Island.

Automobile Club of America Runs

THE run of the Automobile Club of America to Tuxedo, N. J., Saturday, June 8, was not as satisfactory in some ways as it should have been. Only seven vehicles participated in it, although one more started from the club house but withdrew on account of a break-down after crossing the ferry. The day was all that could be desired ; the rain of the previous night having laid the dust, and freshened the air considerably. In fact, it was expected that fully fifteen or twenty vehicles would leave the Plaza for the 37 mile journey, and there was considerable surprise when, after waiting fifteen or twenty minutes beyond the time appointed to start, only six vehicles followed the pacemaker up Fifth Avenue.

It is not amiss to mention a few points which may explain why the Automobile Club of America runs show no sign of increasing popularity. First of all, it should be noted that a 37-mile run, unless it is some special occasion, is apt to have fewer entries than a shorter distance will bring out. By some special occasion, it is meant that there must be some other object in the run besides a mere outing. It will be remembered that in the spring of 1900 the club run to Philadelphia brought out a great many starters because it had been looked

forward to and heralded as a special event, the results of which would be noted. The same distance to be traveled merely as an outing would arouse enthusiasm in very few.

Another reason that may be assigned for an apparent decline in popularity this spring, is that some of the club's well-known automobilists are away from the city, and as was the case on June 8, some were opening up their country houses. There were, however, plenty of owners of carriages who were in New York City and who would have taken part in the Tuxedo journey had they felt disposed to do so.

What may be the chief reason for the club's not having a larger showing, is that the members at large were a little in doubt, after the abandonment of the run to New Haven, as to when and where the next one would be held. It would have been wise had the club issued a notice immediately to members announcing the giving up of the New Haven run and calling their attention to the fact that the next objective point would be Tuxedo. Then, later on, when the circular describing the Tuxedo run was sent, members would already have made their plans for it and the circular would be no surprise, and in fact to those that were looking for it, would have been most welcome. The suspense during the interim of the abandoned New Haven run and receiving the notice of the Tuxedo run probably caused a number of autoists to make plans which could not be interfered with when the Tuxedo announcement was received. Such things as these are little details in club management which are worthy of consideration.

Another detriment to runs previously held by the club, has been the lack of proper directions for reaching the terminus. The Runs and Tours Committee this year, under the chairmanship of Mr. Dave H. Morris, commenced a popular innovation by distributing maps of the route, accompanied by directions, names of streets, towns, etc., passed through, but although the wording of the instructions has in some cases been complete, in others it has been the reverse. The directions for the Tuxedo run fulfilled the mission in a way that left no room for complaint except from those who were totally ignorant of the towns through which the route was laid. The line of travel should have been described more comprehensively. It is always difficult for the informed to describe anything that will make the uninformed fully enlightened; but this must be done if the printed directions for the club runs are to thoroughly fulfill their intended mission.

As an example of how a few extra words would make a great difference in explaining a matter, the following is cited. One of the

clauses in the club's directions to Tuxedo read : "Arriving at Hackensack, turn to right on Main Street and follow Main Street five or six blocks to Passaic Street ; then turn left," etc. The difficult part was to find Passaic Street, for many of the streets passed were not named, and the automobilist, passing quickly at each corner, would wonder whether he had reached Passaic Street or had already passed it. Then to add another complication, it may be said that Passaic Street was five or six blocks away on one side and probably eight or ten on the other, some streets not continuing across Main Street. Had it been mentioned that Passaic Street had a number of conspicuous signs on the corner, which any automobilist could not fail to see, in marked contrast with a lack of identification of other streets, no feeling of apprehension would have been felt by anyone that Passaic Street had already been passed.

Then again, another clause in the directions read : "In Suffern, turn left across the Erie Railroad tracks, and follow road parallel to track," etc. As the railroad tracks come in sight a long distance from Suffern, automobilists might wonder when and where they should cross the track. Had the directions mentioned that after reaching the railroad track, continue on same road for several miles until Suffern is reached and then cross the tracks just above the station, etc., it would have been far more explicit, and have prevented considerable guessing on the part of at least two automobilists that the writer knows of.

Were it possible for all machines to keep in sight of the one in advance, then there would be no difficulty about finding one's way to the objective point ; but unless club runs are conducted positively by rule so far as following the pace is concerned, more comprehensive descriptions of the route than have yet appeared must be furnished. It can readily be seen that if the pacemaker knows the way, and does not go too fast for all to keep up with him, no one will lose the trail ; but, were this idea carried through, the run on account of some machines being so slow or uncertain in action would necessarily be so uninteresting that few would find pleasure enough in it to take part, unless it were a short distance or through some thickly populated district where no machine could be let out faster than a reasonable limit.

Concerning the pacing, as laid down by the recent resolution of the Board of Governors of the A. C. of A. and which will be found elsewhere in this issue, it may be said that the fact that a pace is to be followed will deter some who like to speed from going on a club run. These do not like to trail behind some other vehicle, and take the

dust ; but it is doubtful if there are enough who feel this way to cause, in the long run, a serious inroad into the numbers that will take part ; and the fact that following a pace will suit the majority of those on pleasure bent on club runs has caused a general feeling of approval of the pacing rule.

Those taking part in the Tuxedo run were : Cornelius J. Field and George Isham Scott on an 8 horse-power De Dion-Bouton, new type machine, with the motor in front. These gentlemen acted as pacemakers and they had the fastest machine. A mechanic was on the rumble. Dave H. Morris and friend were on an Electric Vehicle gasoline machine ; William A. Hall and friend occupied a Winton ; Samuel H. Valentine and his brother, and Kenneth A. Skinner and Malcolm W. Ford each occupied a 5 horse-power De Dion-Bouton ; George B. Goldschmidt and friend were in a Winton. Jefferson Seligman and friend drove an Electric Vehicle gasoline machine. R. H. White with P. H. Deming was in a White Steam Carriage. Isaac Stern with his son joined the party at Tuxedo in a Panhard-Levassor, he having crossed the Hudson at Nyack.

Mr. Field continued as pacemaker on the outward journey until the Fort Lee hill was half over, when he resigned in favor of Mr. Skinner on account of Mr. Scott's desire to stop until it was seen that all vehicles were on the way. Only one member of the party, Mr. Goldschmidt, was found to be in trouble with his machine, and he dropped out. Mr. Field and Mr. Scott then followed the trail and easily overtook the bunch. Mr. Scott had charge of the general management of the run and made an agreeable director. All arrived at the clubhouse at Tuxedo except Mr. Goldschmidt. There were some hills on the way that severely tested all machines. The luncheon party was unusually sociable and afterwards a little time was spent under the sponsorship of Tuxedo members visiting some of the features of the place, such as the trout preserves and court-tennis building.

On the return journey Mr. Field and Mr. Scott took the lead and kept it to the ferry, making the thirty-six miles and a half in about one hour and seventeen minutes. Mr. White arrived second at the ferry, just missing the boat that the leader's car caught. Mr. Skinner was next, taking the same boat with Mr. White, and others followed at longer intervals. Considering everything, the run was a success, but to make these occasions more generally attractive they should perhaps be planned more in a way to make it easy for the average autoist to engage in.

Touring Car of the Autocar Company

THE touring carriage shown herewith was built by the Autocar Company of Ardmore, Pa., for Mr. Wm. Morgan, Secretary of the company. Previous to the building of this carriage Mr. Morgan had been abroad and studied foreign vehicles. Being an enthusiast and having practical ideas as to what a motor vehicle should be, he decided to have one built according to his own ideas, and the carriage illustrated is the result.

The car is fitted with two of the company's standard motors side

Side View of Touring Car

by side and mounted on the front, being covered with a bonnet as in French practice. Each cylinder is of 4-inch bore and has a stroke of 4 inches.

The crank shaft, 2 to 1 gear, and in fact all moving parts of the engine are incased in aluminum and in this way are protected from dust and dirt. Lubrication of the various parts is effected by a Lunkenheimer multiple oiler. This is a special feature and quite a

valuable one. One-quarter inch copper tubes are used for conveying the oil to the various parts. This is fitted to the dash and a sight-feed attached to each drip, so that the driver can see from his seat exactly the amount of oil going to each part of his engine.

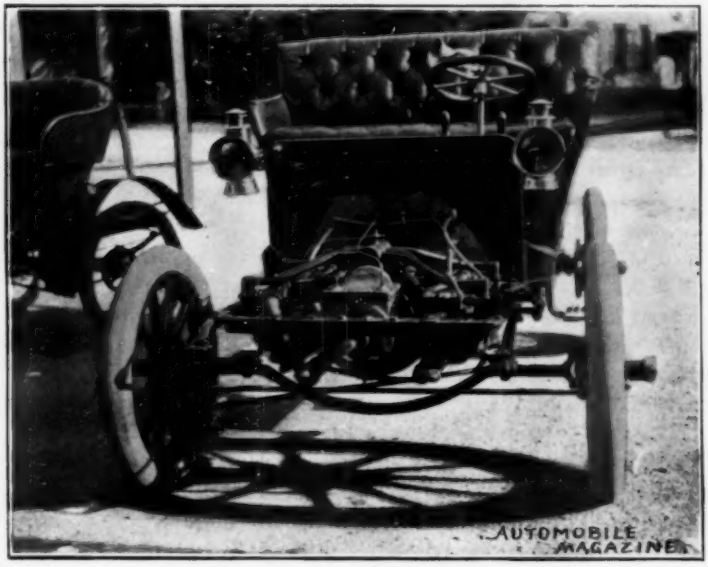
The sparking device is of the Autocar Company's standard type. The mechanical vibrator used is the patent of Mr. L. S. Clarke, president of the company, and embodies features which make it almost impossible to miss an explosion, regardless of the high speed of the motor. The motor runs normally at about 900 to 1,000 revolutions per minute, but can be speeded up by a button on the floor to 1,800 revolutions per minute. This button controls the spark lead and at the same time controls the throttle on the vaporizer. The vaporizer is entirely automatic, giving the exact amount of air and gasoline at all speeds of the engine. The transmission device is on the usual slide gear principle, with an interlocking device, which prevents the gears from moving out of mesh when the clutch is applied and vice versa.

Under the front seat are two tanks for holding gasoline and water. These tanks have a capacity of about 200 miles over the average road. The batteries are located under one of the rear seats and three cells are all that are used while running, although the batteries are put up in two sets with a two-point switch, so that should the batteries become exhausted while out in the country a new set of batteries can be thrown on instantly by moving the lever from one point of the switch to the other.

A very large and effective radiator is placed under the rear seats at the back of the carriage and in such a position where the full force of the air strikes the flanges.

The front and rear axles are 1½-inch forged. The wheels are 32 inches in diameter, 1½-inch wood spokes, with 3½-inch Dunlop detachable tires, specially made for this particular car. The hubs of these wheels are made of cast steel of the French military type. The carriage has a seating capacity of seven people comfortably. The back portion of the tonneau body shown on machine illustrated can be removed, if necessary, for racing purposes or for carrying trunks or camping outfits when but three passengers are carried. There are two sets of brakes, one brake attached to the countershaft (or compensating shaft), the other brakes being applied directly to the rear wheels. The engines are so arranged in the front of the carriage that by simply removing the hood everything can be gotten at with ease.

A centrifugal pump forces the circulation of the water through the engine to the radiator and from the radiator back to the tank under the seat. This pump is driven by a belt off the flywheel, and has a tightening device whereby the slack of the belt can be taken up almost instantly. Wheel steering is used, with the usual worm and worm gear. The frame of the carriage, which carries the body, transmission device and motors, is made of 2½-inch angle iron. All nuts and bolts are cotter pinned and lock nutted, thus insuring freedom from trouble caused by their working loose.



Front View with Bonnet Removed

Several sets of sprockets are included in the equipment of this carriage, so that speeds can be changed, giving a variation of from 2 to 31 miles per hour. Each part of the car is well thought out and carefully considered, and after many trial trips it has been pronounced a success.

It was built with the intention of entering the New York and Buffalo endurance trials and also the races which are to be held during automobile week at the Pan-American Exposition.

Some Automobile Experiences

ON March 13, before the Automobile Club of Great Britain and Ireland, Mr. H. Edmunds, M.I.C.E., M.I.E.E., read a paper having the above title, and we take pleasure in reprinting the following abstract from it :

My first experience with motor cars began in 1897, with a De Dion tricycle, with its air-cooled cylinder, electrical ignition, surface carbureter, and control effected by varying the mixture, or altering the period of firing, or not firing at all. The experience gained was certainly very useful ; and I think that any man who can comfortably manage a De Dion tricycle has gone a long way towards mastering all petrol motors and explosion engines.

Governing—The alteration of the mixture, however, for purposes of varying the speed is not desirable. There is only one proper mixture when true combustion takes place, when there is an absence of smell, and when you attain the best results. The excess of air or excess of petrol often causes great annoyance to the public, owing to the smell. As is well known, if you take an ordinary paraffine lamp and turn your flame too high you produce soot, have less light, and cause a smell, owing to incomplete combustion. On the other hand, if you get just the proper adjustment, you obtain the maximum light, and combustion is entirely odorless. Turn the flame too low and you again have incomplete combustion, accompanied by the distillation of noxious vapors. I therefore think that this mode of governing an engine by varying the mixture is very undesirable, and the constant mixture engines—such as the Daimler, with a centrifugal governor, which entirely cuts off the charge instead of varying the mixture—are, from this point alone, very much better than the other type of engines.

We are not here to discuss improvements in engines, but I think the right direction for the governing of an explosion engine will be, not by varying the mixture, as in the De Dion type, and not by cutting out a cylinder or cylinders as in the Daimler, which is apt to give an intermittent turning movement, though probably very economical as regards the consumption of petrol, but we must seek to govern by varying the compression according to the work demanded from the engine, keeping our mixture of petrol and air constant, but altering the amount of mixture according to the demand.

Ignition—The ignition or firing question is one of considerable

importance. There is no doubt that great differences are caused by firing—greater than some people recognize—and it is important that the firing occurs at the proper moment. In electric ignition this is comparatively easily arranged for. By moving the commutator you can advance or retard the sparking. In the tube ignition, however, the conditions are different. You have practically a fixed point only at which you can fire, this point being due, among other things, to the temperature of the tube, the distance of the Bunsen burner from the end, the thickness of the platinum, and the amount of compression of the mixture. As is well known, the makers often spend a considerable time in arriving at exactly the best results and conditions, and I maintain that these conditions are only approximately the best, and very often are a mean rather than the maximum. If you fire too early with tube ignition, you are apt to have a bad back-stroke in starting your engine. Some people have gone so far as, after lighting the burners, seeing that they are in good condition and working properly, to then momentarily turn them down, slightly cooling the tube, and thus making it fire a little later and getting rid of the shock. In electric ignition all this is under most complete control. You set your commutator to fire late, which enables you to start your engine with great comfort, and then you can regulate the firing earlier until you get to the best condition. In engines with two or more cylinders, if care be not taken, one may get a sort of mean, instead of the maximum, due to the contacts on the commutators not being in the exact position to produce the best results in each cylinder.

Batteries—All things considered, I think the secondary battery or accumulator has most to commend it, especially where you have a convenient source for recharging available. The voltage with lead couple is about two volts, and two couples or four volts are generally enough, though it is well to have a little extra pressure in hand. The low pressure current from the battery is transformed into high pressure in the induction coil, the ordinary type with vibrating contact maker being probably the simplest and best. The current to the primary is interrupted or completed by means of passing through a commutator attached to the cam-shaft, and one of the simplest forms is similar to the one I have on my car "Rhoda," which consists of two piston spring plugs similar to the contacts in the bayonet holder of a Swan lamp, though rather larger, which are screwed into the metal cog wheel on the end of the cam-shaft, making moving contacts, which revolve against brass surfaces which are imbedded in a disc or

plate of vulcanized fibre held up against them, and from which surfaces are connected to the several wires, according whether you have one, two or more cylinders to the respective terminals of the induction coils. Thus, as the cam-shaft revolves, these moving contact pistons make and break on the several stationary contacts, and the firing is produced at the required period by rocking to and fro the vulcanized fibre disc carrying them. In this arrangement we have no additional revolving parts, and I found in practice that the contacts keep themselves clean by their alternately passing over the fibre and metallic surfaces.

Ignition Plugs—Speaking of firing brings us to the question of plugs. One might say that their name is legion. I have used with considerable success both the ordinary De Dion and the Réclus plugs, and also a form employed in the Decauville. This, though rather more delicate than the shorter ones, has the advantage of being easily and readily repaired in the event of the porcelain fracturing. It is a curious thing that many porcelains break away when first used, but if they survive their infancy their length of life seems to be indefinitely prolonged, and I have very little trouble through these breaking down.

Tubes—In some cases a platinum tube probably gives out before its time in consequence of tin, solder, lead or some softer metal being accidentally brought into contact with the platinum, causing it to alloy and melt at a comparatively low temperature. There is also a tendency for platinum to become very brittle and friable when heated in the presence of carbon, and carbon is often formed in the tubes through the burning of oil used for lubrication getting in from the cylinder.

Position of Plugs—As to the better position for the plugs, at the top or side of the cylinder, I think there is no doubt about the latter being better. At the top, one is apt, in the event of excess of oil, to get the plug splashed and practically short-circuited through the carbon formed. I have several times had rather interesting experiences in this relation. Recently, in running to Richmond, in consequence of the greasy condition of the road, I was proceeding cautiously, mostly on one cylinder. The result was that the forward cylinder, probably having a little too much oil, got the plug covered, so that when I started into Richmond Park and wanted both cylinders, I found the engine would not pull. On removing a plug I saw what the trouble was, cleaned it, replaced it, and set off again, and again in a few minutes I found she would not pull. There was evidently too

much oil in the cylinder, and as I had not time to bother about clearing the oil or again cleaning the plugs, I lighted the tubes. This soon showed what the trouble was, the engines going well, but throwing out dense thick smoke from the exhaust during the burning of the lubricating oil. After the smoke had ceased, the oil being cleared away, I turned on the electric ignition, closed down the burners, and everything ran satisfactorily, showing that where you have both tube and electric, you can, as in this case, very often clear your plugs by continued explosions, which explosions, however, if the electric is interfered with, cannot take place until the plug is cleared.

Now these plugs were in the top of the cylinder. The plugs in my old car "Rhoda" have been put in the place usually occupied by the burners (at the side), I having done entirely away with the burners in this case. I have not had a single instance of ceasing to fire, even with excess of oil, when I have purposely tried to get these conditions. I think from every point of view—control, safety from fire, readiness to start, higher efficiency, etc.—the verdict must be in favor of electric ignition. There is nothing very mysterious about maintaining the electrical conditions in good order. The troubles that arise are generally small, unsuspected faults—often a loose screw giving a faulty contact is more to blame than anything else. The earth return, by which I mean the contact from the frame or mass of the metal either to the contact or to the induction coil for the high tension spark, is often an unsuspected source of trouble; and a very good practice on the earth return is to use a bare copper wire without insulation. This can always be seen and traced, it is distinct from insulated wires, and it is an additional safeguard if the wire be soldered so as to have a complete metallic contact, rather than allowing for screwing or jamming up, which may become untightened, and which may be rendered useless by oil or dirt creeping in.

Stopping and Starting Engine—Another advantage of electric ignition is that under suitable conditions you can stop and start your engine without having recourse to turning by hand. In order to do this it is only necessary to arrange that before the stopping of the engine you open your battery circuit. This causes the firing to cease. Meanwhile the momentum of the fly wheel will cause an explosive charge to be drawn in. This is not exploded, but when the pistons come to rest it remains in some cases for over twenty-four hours, and it is only necessary by means of a separate firing key to fire the right cylinder and the engine is started up. Some care, however, is required

in performing this operation. First to fire the proper cylinder (or else the tendency is to start the engine backward). Second, to be careful that an overcharge of mixture in the silencer is not fired, as this may produce unpleasant results, such as the bursting of the silencer. By properly venting the exhaust, however, very little risk need be run in this direction.

Water Circulation—In order to get good results in a petrol engine, you must keep it cool, and the water circulation must be thorough. On my Daimler car "Rhoda" (the only one that was in the thousand-miles trial, numbered A12), nearly all the troubles and annoyances have been due to faulty water circulation. Pumps are all very well so long as they act, but they are an additional source of trouble to look after and keep running. In winter time, too, the whole apparatus may freeze up. This, however, can be provided against either by emptying out the water (which is not practicable or easy to do in some instances), or by adding from 20 per cent. to twenty-five per cent. by bulk of good commercial glycerine to the water. This has the property of preventing the water from freezing at any ordinary low temperature such as we have in England; and, further than that, if the cistern does not leak the evaporation which takes place in use is confined to the water, the glycerine remaining behind, so you can add fresh water to make up the losses in this way, and yet retain the anti-freezing properties of the glycerine.

When ordering my new car "Antrona" I determined to try the Estcourt cooler. I have not had five minutes' trouble in regard to water circulation, and I have used it over many, many miles of travel.

On a recent run between here and Coventry, a distance practically of a hundred miles, and on very heavy roads, the water consumed was less than half a gallon. The advantage of this form of cooler is that it is entirely free from any pump and quite automatic in action. A further advantage of this cooler is that you get a certain amount of warmth through the circulation in cold weather, while there is no appreciable annoyance from the heat in hot weather. The advantage of the side wings, with their convenient cupboards, is also very great, and prevents a good deal of draught and air blowing across the feet in driving. It is also convenient to have all the water at the front, and no worry as to looking at the back to see to the water supply—not to mention the greater or less unsightliness of the water radiator under the rear of the car, where it is often the practice to place it.

The Clutch—In sequence, we might pass on from the engine in

the Daimler through the clutch to the speed change gear. The clutch is a most valuable feature when kept in good working order, and if carefully adjusted and properly understood is a most important medium between the constant speed engine and the variable speed gear. Learning to use a clutch properly is, I think, akin almost to the delicate touch required in playing the violin ; you must not too abruptly close up the clutch. It has a tendency to give a jerk, which certainly does your chains no good, and produces a strain through all the moving parts, and many a time, by partially declutching, allowing the requisite amount of slip which does not hold back the car nor allow the engine to get its full revoltions, will often enable a skilful manipulator to negotiate roads and grades without changing the speed gear. Different motorists have different methods of keeping the clutch in good order ; an occasional dose of castor oil keeps the leather pliable and soft, while a puff of fuller's earth prevents too much slipping through grease having got on the surfaces, but the best mode of keeping the clutch in good order is well worth while discussing.

Change Speed Gears—We next come from the clutch to the speed change gears, the proper manipulation of which is one of the most difficult things for the novice to acquire, while the results make all the difference as to the wear and tear of the gears. I have found it best to completely declutch when going from low to a high speed, and very often in going from a high to a low, especially when ascending, to slip over the changes without declutching, except with the slightest relief of the clutch by the foot synchronously with a movement of the hand on the levers.

Sprockets and Chains—From the gear we pass on to the sprockets and chains. Keeping a chain in good order is of considerable importance. A duplicate set of chains is very desirable, and a capital method of keeping them in excellent order if a car is in regular use is to wash the dirt and grease out with paraffine and then boil in Russian tallow. A good method of doing this is to have the chain suspended from a pulley with the lower portion of the chain, say a foot or so, submerged in a bath of molten tallow ; then, by carefully rotating the chain, allowing time for the tallow to partially run back and set, you get that complete envelopment of the grease which I can, from experience, say adds considerably to the life and good running of the chain.

Wheels and Tires—Without considering the construction of the wheels, we will at once go from them to the tires. We may divide rubber tires into three classes—the solid, pneumatic and compound.

For comparatively heavy loads moving slowly on ordinary roads, the solid has much to commend it, but when we come to the question of high speed (twenty miles an hour and upward) it would almost appear as if the pneumatic were a necessity. Pneumatic tires, however, are attended with the great drawback of liability to puncture, and the consequent and annoying delay for removal and repair; also on greasy roads and under certain conditions of surface, extra care is required to prevent sideslip with the pneumatic. It would seem as if a film of moisture were enclosed between the surfaces of the road and the rubber, which is akin to that produced on the *chemin de fer glissant*, where advantage is taken of this preoperty of a heavy body floating on a film of water for purposes of transport, and I know of nothing more demoralizing than a sideslip. Every other condition can be provided for; you may steer to a nicety, you may control your speed absolutely with powerful brakes or accelerator, but the sideslip is very difficult to prevent. My own idea is, if the road surface be uncertain, go cautiously, refrain from putting the brake on abruptly (which is often very difficult when you are going down hill and something unexpectedly crosses your path), be careful as to your steering if you must suddenly deflect from your course; sometimes a feint of a movement in the direction opposite the one you want to take, dexterously applied, may produce an artificial sideslip in the direction you want to go, and prevent mishap.

On my new car I had Falconnet compound pneumatic tires. These gave great comfort and resiliency, and remarkable freedom from sideslip, there never having been a sideslip on this car, which I think is very remarkable, seeing I have driven it under all conditions of weather in and about London nearly every day during the last winter. The tires should not now properly be called pneumatics, because I had the air tubes removed from the driving wheels since my run in Scotland last August.

I had a somewhat curious experience there. The off driving wheel tire suddenly jumped from its groove on to the rim while traveling at about twenty miles an hour, in consequence, probably, of the air tube deflating, which caused the wedgelike pressure which helped to keep it in place to be suddenly removed. Knowing that it would probably take some time to get a new air tube from France, I saw the North British Rubber Company in Glasgow, who suggested substituting for the air tube a solid section of vulcanized rubber. This appeared, when the tire was put into position again, to do what

was necessary as a substitute for the air tube, and while the weight was slightly increased, the resiliency was not much affected, but after running some two hundred miles I noticed the tire appeared to be very much flattened, and about the rim there was a good deal of brown snuffy looking powder. When going into Barnard Castle, I felt a very uncomfortable bumping movement, though not going rapidly, and on stopping was surprised to find that the tire and rim of the wheel were extremely hot, accompanied with a powerful smell of burning rubber. I went slowly into Barnard Castle, and removed the tire, and was surprised to find that the insertion of rubber had powdered itself away to half its weight and thickness; evidently there had been considerable creeping between the two tires, accompanied by considerable heat and friction. On my return I took this tire to Paris, relating my experience to Falconnet, who said it confirmed their experience that it was not feasible at anything like a high speed to have two independent solid rubbers enclosing one another; hence they developed their well-known plain compound tire as distinct from pneumatic, in which the interior section is peculiarly soft and resilient, and the outer section is more durable, harder and resistant. They converted my driving wheel tires into the plain compound, and I have never had five minutes trouble with them since. Of course, my speed has never been excessive, not exceeding twenty to twenty-four miles an hour, but often conveying a load of thirty or more hundredweight total.

Valves—A car with an indifferent valve is like a man having asthma who is going to run a race. The ordinary Daimler induction valve has on its spindle two nuts and a spiral steel spring. The nuts limit the amount of opening and the spring closes the valve. Now, I have often experienced a stripping of the nuts, the breaking of the end of the spring, the sticking of the valve to its seat; any of these is a serious source of annoyance, though comparatively trifling in itself, to the motorist.

Petroleum Spirit—I find a good method of keeping the burners in order when flames are used is after putting out the flames to allow the jet of unignited petrol to issue for a few moments, which appears to dissolve and wash out any oily or carbon matter that may have formed, and which would otherwise solidify and obstruct.

The Integral Cylinder

MANY questions are asked relative to advantages of gasoline motors that are cast integral (cylinder, valve chamber, head and water jacket) and, too, there is much criticism on an inclosed base and light constructed motors.

In replying to these questions we must use little theory and a great lot of practical facts. The joint of the head can be made tight with packing, but what a trouble to remove and put back again. If the temperature of head should be a little greater than the cylinder (which occurs in engines with small water connections from cylinder to head and variable loads) your packing is being sawed and finally a leaky joint occurs through difference in expansion. If your joint is ground it may or may not have enough metal in it to keep it from springing with explosions of motor. There is danger of a mite of dirt on it when putting together springing the whole joint, besides various other more trifling causes. Among the leading automobile manufacturers in Europe the joint has entirely disappeared, which in itself is conclusive proof that they were not satisfactory. With the cylinder cast integral there are no joints to speak of, and it makes all the other combinations more simple.

The manufacturing of such cylinders on the other hand is exceedingly tedious and many attempts have been made in this country to produce the integral cylinder that would contain proper metal combined with skill to answer requirements, but failure has generally been the result, with the exception of a very few, among them Mohler & De Gress, of 218 Albert St., Long Island City, who have mastered the art and are now turning out motors of this description in quantities. They claim to have lightness, tenacity and good wearing qualities. The motors are certainly excellent specimens of workmanship and have given surprisingly good results.

For those of our readers who may be looking for motors with a view to building their own carriages these ought to be especially welcome.

Transmission Gears of Some European Cars

UNDOUBTEDLY one of the most interesting features of any automobile is the transmission gear. In this connection it gives us pleasure to publish the following abstracts from a paper presented by Herbert Austin before the Cycle Engineer's Institute at Agricultural Hall, London, May 9, 1901. It will not be possible for us to reprint all of Mr. Austin's interesting paper. In it he takes up a number of the more prominent and better known systems of gear transmission and compares them. We will confine ourselves to but three of these, the well-known Panhard system, also the De Dietrich and Renault. As there are quite a number of Panhard machines in America the description of that system will be read with special interest. By way of introduction, he said :

The motor itself has been generally considered the most important part of a self-propelled vehicle, but the idea is growing, and not without good reason, especially among makers, that the method of transmitting the power from the motor to the driving road wheels is, perhaps, even more important. This may be partly accounted for by the fact that the motor itself has been brought to a high state of perfection as a fixed engine, whereas the driving gear of motor cars was, until a year or two ago, very little understood. It would appear to many at first sight, no doubt, a very simple problem to design an efficient means of conveying the power from the motor to the road wheels by utilizing one of the many well-known forms employed in ordinary practice, but it is only after a year or two's experience that makers and users begin to appreciate the many drawbacks there are attached to the use of any of the systems at present employed. Each and every system has its good and bad points. It does not at present appear possible to obtain a system which embodies all the good points and which has none of the bad ones, and one gets bewildered as to what good points to make use of, and what bad points to put up with. Perhaps it will be best to give, first, a brief summary of what I consider the essential features of a perfect system (I use the term in a qualifying sense only), and then examine the various leading systems, and see how far they comply with the requirements set forth.

The following list of conditions must not be considered as arrang-

ed arbitrarily in their order of importance, as that is to some extent a matter of personal choice.

1. Efficiency—By efficiency I mean economy in consumption of power, or, in other words, the loss which results in conveying the power from one point to another. It must be obvious to anyone that (unless there is very good reason for it) it is folly cutting down in weight the vital parts of the rest of the carriage to make it light and easy to force along, in order to use an inefficient system of transmission which needs a much larger and heavier motor than would otherwise be the case to overcome the heavy loss which such a system may involve. I have placed this feature first, because everything on a motor carriage has to be cut down to a very narrow margin of safety, dimensions being largely gathered from experience of what will only just take the strains each part has to stand, any allowance as a factor of safety being practically *nil.* Therefore a perfect system should consume the very least amount of power possible in order that as much margin as practicable may be allowed in the strength of all vital parts, and not necessitate a larger motor or the use of more motive power than is really required for the work to be done at the road wheels.

2. Adaptability—I mean its use without in any way detracting from or interfering with the other necessary adjuncts of a perfect road carriage. It is only reasonable to suppose that one might be very much disinclined to use what might otherwise be a very good gear, if it interfered very much with the comfort of the passengers or appearance of the car, or necessitated the placing of the motor and other parts in such positions as would prevent their being easily got at for examination and repairs.

3. Simplicity—This feature is one which will appeal largely to the non-mechanical users of motor cars, and even a mechanic's interest in an intricate and complicated piece of mechanism soon wanes, when he finds out that each extra part is only so much more trouble, annoyance, and expense. It is an essential feature which may, however, be easily carried to a point where it becomes a disadvantage, and is more to be considered in combination with other desirable features than possibly any other. Nothing is, for instance, simpler than having just one direct speed on to the driving wheels, but this is only possible with an electric or steam driven car, and is quite out of the question on a carriage driven by any internal combustion motor at present known. Simplicity no doubt means economy in first cost—that is, if it does not

require a more expensive motor and adjuncts—and so will always be an important factor in cheap cars.

4. Lightness—As pointed out in feature No. 1, lightness is a *sine quâ non* of each and every part of a car, so that it must be carefully considered in deciding on what system to adopt. It will, no doubt, be more favored by those wanting a very light car than those who would be satisfied with a little more weight and perhaps less expense and greater durability. To obtain the best results in this direction aluminum must be used wherever practicable, and as this metal is still dear and difficult to manipulate, it means some sacrifice on the score of cheapness, and consequently it cannot be adopted on low-priced cars.

5. Durability—This is an increasingly important feature of every part of a car. A few years back, when the present automobile movement was in its infancy, no one was much concerned as to how long a car would last, but now that the first flush is over users are becoming aware of the fact that what may be a cheap car in first cost may be a very dear one before it has run many thousands of miles. It does not follow that to be durable a gear must be very simple, although this is a generally accepted axiom, but its chief hope of a long existence, I think, is to be looked for in the action by which the speed change operates the material of which the various parts are made, and the way it is protected from the dirt and dust.

6. Manipulation—This feature may be looked at in two ways. It may be considered purely as to the amount of effort or care required to operate the speed changes, or as to the general handiness in relation to repairs in out-of-the-way places, and attention and care in general.

7. Cheapness—I have placed this feature last, because I mean by cheapness the first cost ; its ultimate cost or cheapness in working coming, I consider, under the head of durability. Looked at from purely a manufacturer's standpoint this feature would, no doubt, be placed much earlier in the list ; and as years go on and competition becomes keener it will assuredly be an important point, but at present it seems to me that many of the other features should receive preferential consideration, espectally from a user's standpoint.

Having now set forth and explained the essential features, let us see how the various systems comply with each.

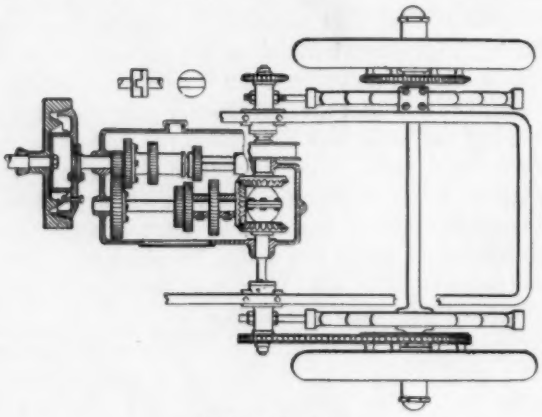
[NOTE—I do not propose to enter into the question as to who designed or originated the systems, or into their early history, as that aspect of the subject is of no use whatever to the man who wants a

good and satisfactory transmitter, and in giving a name to any of the systems I merely make use of the name with which each system is generally associated, in order to distinguish one from the other.]

I.—Panhard System.

Vertical engine in front of car, friction clutch to engine, sliding change-speed gears arranged lengthwise of the car, bevel gear wheels to cross or differential gear shaft, and chains to both rear driving wheels. The Daimler, Mors, Cannello Durkopp and Napier come under this heading, being almost identical with a Panhard car.

Efficiency—Admitting the necessity of making the various parts of a car as light as possible, it is obvious that the system should not



Panhard System

be too dependent on the rigidity of the framework to which it is fixed. An examination of the Panhard system at once shows that it is very largely dependent on the framework, because the bearings of the engine, the gear box, and differential gear shaft should all be kept exactly in line, or otherwise the efficiency will be very much impaired.

Partly with the view of overcoming this defect, and to allow of the gear box being removed without dismantling the side brackets, etc., the outer ends of the differential gear shaft are made separate and connected to the center portion by claw couplings.

This is a very dubious advantage, and it is a question whether, under certain circumstances, it is not making matters worse. No doubt it obviates the necessity of stiffening up various parts, and helps

to keep down the weight, but most mechanics will come to the conclusion that there must be a considerable loss of power in short outer bearings, which have to carry so much of the strain, and which will often be considerably out of line with the center portion, owing to their being fastened to a part of the frame which is not very rigidly connected to the part carrying the center. To keep the gear box and engine in correct alignment has been found to be a very difficult undertaking in high-powered cars, as, apart from the deflection of the frame resulting from the irregularities of the road, the engine exerts a very powerful twisting action, which must at times seriously reduce the efficiency of the driving mechanism. The use of bevel gears between the top change speed shaft and the cross shaft is necessary because the engine is placed at right angles with the direction in which the car moves, and while this is probably the most convenient method to adopt, it is nevertheless indirect and wasteful. I well remember the first time I saw the sliding gear system of changing speeds on a Panhard and Levassor car at their factory in Paris some five or six years ago, and how barbarous the idea of dashing one gear into another appeared to me at the time. Later experience with this and other gears has driven me to the conclusion, much against my will, that it is the most efficient method, once the gears are in mesh.

As the rear axles are connected to the frame by springs, the drive between the wheels and the differential gear shaft must be flexible and as direct as possible, in order not to deflect the axles. Any indirect or rigid drive would limit the action of the springs, and would necessitate having the axle guided between horn plates similar to those used on a locomotive. This would be very undesirable, and as chain driving is so direct and flexible, it is difficult to see how the Panhard system could be improved in this respect. In deciding on the connection between change-speed gear and the axle, it should be borne in mind that as little dead weight as possible should be placed on the axle, especially when solid tires are used, or they will be subjected to very severe shocks when going over rough ground. Tires being at present the most unsatisfactory portion of a car, it is evident that the Panhard system in this respect is a good one, and to get the best results the sprockets and chain wheels should be kept rather small in diameter and wide apart, so that the twisting out of line of the back axle shall not cause too great a side strain on the chains. To sum up, the Panhard system, on the whole, cannot be considered an efficient one, and there can be no doubt that the excellent results already

obtained would be readily surpassed if the defective parts of this system of transmission were improved.

Adaptability—On the score of adaptability the Panhard system is good. The motor is in front, away from the carriage body, and the heat and danger from fire are isolated as much as possible. It can be easily got at without dismantling the body, etc.

The speed-change gear is below the frame, and it allows the carriage builder full scope to put on what type of body he considers best, without having to make allowance for any mechanism beyond the fact that the footboards must be loose, to allow of the gear being examined.

Having the engine in front, and covering it with a suitable bonnet, distributes the weight better, and allows the passenger to sit well back, makes the car ride better at high speeds, and generally takes away a good deal of the horseless appearance so much associated with a motor car.

Simplicity—The Panhard system, compared with many others, cannot be considered very simple; in fact, there are few more complicated, and yet it must be borne in mind that it has usually four forward speeds and reverse, and that some of the other methods obtain their simplicity by having only two forward speeds and no reverse. Its chief complications lie in the right angle drive between speed-change shaft and differential gear shaft, the method of obtaining the reverse speed, and the differential gear shaft in three pieces.

Lightness—A car with this system of transmission cannot be built very light without sacrificing its durability and efficiency, because, as before pointed out, it requires a very rigid frame, and consequently a rather heavy one. The power has to be conveyed practically the whole length of the car.

Durability—This must always be largely governed by efficiency. If a motor expends a certain proportion of the power it exerts in overcoming undue friction, it will mean rapid wear on those parts causing the friction, and it follows that the parts will not be durable. The conclusion was arrived at that this system could not be very efficient, and consequently some portions cannot be very durable. The system of sliding one gear through another will always be wasteful, especially where care is not taken to release the clutch first, and it is a question whether some of the efficiency gained by this device had not better be sacrificed for increased durability. In designing a speed change gear it is of the utmost importance that the change may be effected very quickly,

or otherwise the car will lose momentum on a hill, and necessitate commencing on the lowest speed, instead of being able to go up, say, on the second speed. Anyone who has driven a car with Panhard system of change gear will have experienced considerable difficulty in getting the teeth of one set of gears into mesh with the others unde certain conditions, and a moment's consideration will readily explain this. To get sufficient strength, the parts cannot be made very light, and consequently the double clutch, the square shaft carrying the sliding gears, the sleeve with gears attached which slides on this shaft, form together a considerable mass of metal, which has an equivalent inertia or momentum, as the case may be. Now, supposing we are using the top speed, and, wish to change to the second, the sliding gear shaft running at normal speed, say 700 revolutions per minute, it is obvious that before the change can be effected, this shaft must be made to run at a much increased speed (about 950), and as this has to be done by the edges of the teeth on the gears, it cannot be a matter of surprise that considerable wear takes place ; in fact, it is a wonder they last as long as they do.

The method of obtaining the reverse by sliding one bevel wheel into another causes a very severe strain, with consequent wear on the bearings next to these wheels, especially as it is almost impossible to locate the wheels so that their pitch lines coincide exactly.

Owing to the way the large chain wheels are fixed to the road wheels, a gear-case cannot be fitted which would be at all satisfactory or worth the trouble, consequently the driving chains suffer from the dirt and dust thrown onto them by the tires, and wear out more rapidly than if they were nearer to the center of the car.

Manipulation—A perusal of the foregoing clause will lead one to the conclusion that it is not altogether an easy matter to manipulate the speed changes on this system, and this surmise is to a certain extent correct. Unless the clutch is released completely from the motor before the attempt to change speed, and the car is running somewhere about the speed it will when the connection is made, then the gears will grind away at each other and the effort to get them into position will be annoying and difficult. To stop the car or proceed slowly in traffic, the clutch, operated by a pedal, is very convenient, especially with wheel steering, any system requiring the use of one hand being only suitable for lever steering. The general arrangement of the Panhard system is convenient for repairs or cleaning. The bonnet is quickly removed, and the motor can then be got at also. The speed

change gear can be examined without disturbing the carriage body, but breakdowns generally are difficult to put right in country places, because if anything does go wrong it is usually something beyond the scope of a wayside repair.

Cheapness—As to first cost, there can be no doubt that this system is one of the dearest. The large number of parts, the need for correct alignment and rigidity, and the accuracy required in making the change-speed gearing in order to ensure its not being noisy, all prevent the system being used where cheapness is the main consideration. There is more value in work in the change-speed gear box of a Panhard car than in all the transmission gear of a Benz put together.

IV.—De Diétrich.

Horizontal engine in front part of car, belts to fast and loose pulleys on shaft at rear, sliding change-speed gears to differential gear shaft, bevel gear wheels to two longitudinal side shafts, and bevel gear wheels to rear driving wheels.

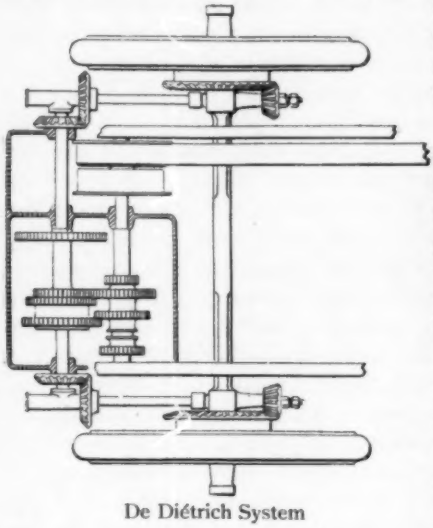
Efficiency—The first portion of this transmission is under similar conditions to the Benz, with the exception that a longer belt is permissible. Sliding gears similar to the Panhard give the necessary changes of speed, the belt being shifted on to the loose pulley when the change is made. The remainder of the gear is, however, quite distinct from the other types, and involves some startling departures from ordinary practice. Bevel-wheel driving is not favored by engineers where more direct means can be employed, and yet this system has four pairs. What the designer had in view in adopting this roundabout method of driving the road wheels, I cannot conceive; and even if it were made in the very best manner, it could not fail to be an extremely wasteful system. In order to allow the axle free play, the side shafts must be fitted with two universal joints each, and these leave very little room to get any satisfactory length of bearing to the ends of the shafts. Ball bearings would no doubt save some of the frictional loss, but the reaction of the strain of turning the road wheels must come on the springs, or be taken up by levers fixed to the frame. In my humble opinion the springs should never be called upon to take this reaction, although it is a practice sometimes followed on light and cheap cars. The method of securing the road wheels in position must be very substantial, or the side thrust of the bevel wheels would force them off the axles.

Adaptability—This system is almost as handy as the Panhard, the

only disadvantage being the position of the change speed gears in certain styles of body.

Simplicity—This system is one of the few which are more complicated than the Panhard, the extra complications lying in the bevel gear connection previously mentioned.

Lightness—The belt drive between engine and change-speed gear obviates the necessity of having a very rigid frame, and for this reason it may be made lighter than the Panhard, though a portion of this advantage is lost in the side shafts and bevel gears, which must be made heavier than the chain connections. I am, of course, assuming that the same amount of care would be exercised in properly boxing in the gears in both systems.



De Diétrich System

Durability—As the belt connection admits of a very light fixed pulley, the momentum of the sliding change gears is not so serious a matter as with a clutch, and by making the driven pulley larger than the driver the speed of the gear may be reduced. Both these variations contribute largely to the life of the gears in comparison with the Panhard, and if chains were used to couple the differential gear shaft to the road wheels this system might be considered very satisfactory.

Manipulation—The lesser momentum of the sliding gears, etc., requires less effort than the Panhard to effect a change, although the belt cannot be shifted as quickly as the clutch. As a belt can be slipped so much better and with less damage than a clutch, the starting of the carriage may be more gradual, and save the unpleasant jerks often experienced with a clutch.

So far as being able to get at the various parts and repairs of breakdowns are concerned, this system may be classed in about the same category as the Panhard.

Cheapness—The saving effected by using a flexible drive and lighter framework is lost in the bevel-wheel gearing, and it is questionable if a car could be made as cheap on this system as the Panhard.

V.—Renault.

Vertical engine in front of car, friction clutch to engine, special change-speed gear arranged longitudinally, universally jointed shaft to bevel wheels on differential gear shaft, which forms a live back axle, the ends of which are fixed into the road wheels. The Darracq and several other small cars belong to this category.

Efficiency—This is the first system in the series in which more than one pair of gears in the change-speed box are in mesh at one time. There has been much controversy as to which is the best all-round method—using gears always in mesh, and engaging a pair at a time by some sort of clutch, or making each pair of gears act as its own clutch, and having only one pair at a time in mesh. There can be no shadow of a doubt as to which is most efficient, and were they judged only from this standpoint the former would have to go to the wall. There are many variations of the clutch, such as sliding keys, etc., but all of them cause a lot of friction, especially at high speeds.

The remarks on the bevel-gear drive of the Panhard apply equally well to this system, though the connecting shaft with universal joints and the short pieces of shaft fixed to the bevel pinion must cause even more loss. The side chains are certainly dispensed with, but the overhang of the road wheels on the axle bearings more than cancels any advantage gained by that alteration. The system is hardly ever used on anything but very light vehicles, consequently the disadvantages are not so accentuated as they would be on heavy carriages.

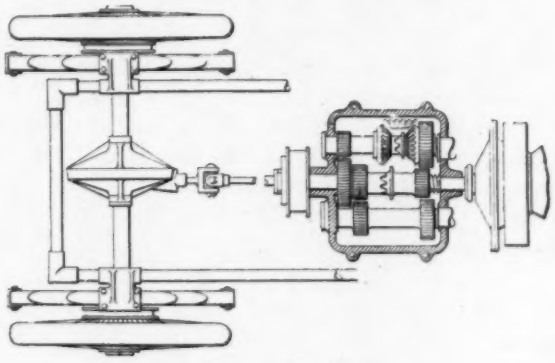
Adaptability—There is very little to say on this point, as the positions of the various parts are very similar to the Panhard, the only advantage being the cleanliness and neatness gained by dispensing with the side chains.

Simplicity—This system is deceptive, and at first sight one would be inclined to consider it very simple, but on closer examination it is found that the only parts of the Panhard gear dispensed with are the chains and sprockets, and this only at the expense of having a live axle. If the complications of this special form of change-speed gear are taken into consideration, there is really no saving whatever.

Lightness—There is nothing to pick between this system and the Panhard on the score of lightness; in fact, it is a question whether

equal strength and power could be transmitted satisfactorily unless it were made heavier. The back axle is a source of great weakness, and must be made very rigid, and consequently bulky.

Durability—It is somewhat misleading to compare a system unless one takes the best examples of that system, and in condemning the Renault change-speed gear on the score of durability, allowance should perhaps be made for a better arrangement of clutches and gears always in mesh. Instead of sliding the gears sideways into mesh, the Renault dash theirs in at right angles to the shaft centers. Both systems are bad, but separation of the pitch lines is only permissible in very extreme cases, and is about the worst thing one can do with a pair of gears. If the mechanism pushing the gears into mesh were



Renault System

not flexible, the teeth would very often meet on top of one another and smash something. It will be noticed that there is no flexible medium between the motor and the road wheels, and this fact must militate very seriously against its durability.

Taking these facts into consideration, it would be unreasonable to expect this special example of the system to be durable.

Manipulation—As usually arranged, the changing of the speeds is not to be compared to the Benz, and is, if anything, more difficult than the Panhard ; but in respect to repairs and cleaning, there is very little to choose between it and the latter.

Cheapness—On small cars it may be slightly cheaper to make than the Panhard, but this is very questionable, because, although the rear axle and side chains are dispensed with, the live axle must be

made at least three times as large and heavy as the cross shaft of a Panhard, and pneumatic tires are almost a necessity. Nevertheless, this system seems to be gaining ground with several firms who make small cars in large quantities, and it is no doubt well arranged for cheap duplication.

The following item may be of interest: An automobilist discovered while on a trip that his motor was not working just right. He came to the conclusion that it was due to a loss of compression. Searching, however, failed to locate the trouble. Being near the home of a medical friend who was also a worshipper at the shrine of automobilism, he stopped, whereupon the man of medicine applied a binaural stethoscope to the motor and spotted the seat of trouble without removing a nut or bolt. It proved to be a leak round the porcelain of the igniter. This aroused the curiosity of the delayed chauffeur, whereupon the doctor demonstrated how, by the aid of the instrument referred to, one could detect the locality of any unusual noise about the machinery. It might be a good scheme for drivers of autos to carry stethoscopes.

The Ohio Automobile Company

A RECENT visit to Warren, Ohio, found the Ohio Automobile Company turning out carriages as fast as possible and orders ahead for several months' delivery. The shop is well equipped with modern tools and everything is being done in a workmanlike manner. The whole place has the appearance of progressive management and it shows why the "Packard" carriage has made friends so rapidly.

View of the Ohio Automobile Company's Shops

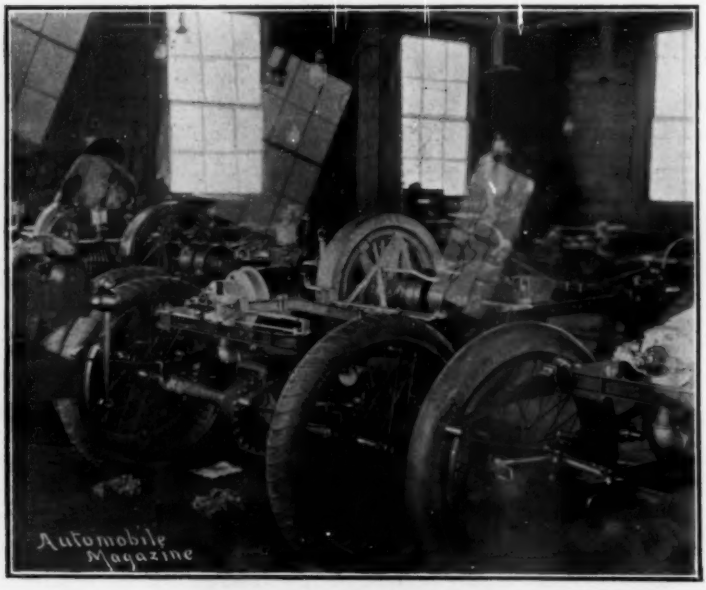
The two views shown give a little idea of the shop, one showing a number of frames with the motors placed thereon. The radiating coils are shown in front of the frames and are of ample dimensions so as to secure cool water for the jackets.

The second view, in spite of the peculiar window reflections, shows the details of construction more closely and is consequently of interest. The spring connection between the flywheel and the countershaft is one of the peculiarities of this machine which it is claimed has much to do with eliminating the "kick" of the engine too common in some machines. At any rate, the carriage is very easy riding and has plenty of power.

Another feature which is not shown is the governor. This controls the time of ignition or sparking; the point of ignition depends on the speed of the engine, instead of *vice versa* as in some cases. As the engine's speed depends on the amount of gas it receives, we can

say that the point of ignition depends on the amount of gas admitted to the cylinder, a combination which is claimed to give a pretty close approach to perfect combustion.

One good thing about this device is that the carriage cannot be



A "Packard" Running Gear Showing Spring Connection on Flywheel.

run faster than the speed for which it is geared ; when the engine runs beyond its maximum running speed the ignition is cut out and no spark reaches the gas in the cylinder.

As showing the great interest being taken in automobile races, in the Paris-Bordeaux event there were eighty-seven entries. The total horse-power of vehicles was 1,200, while the value of the carriages was approximately $400,000.

Among the Clubs

(*Secretaries of clubs and chairmen of committees are requested to send in items of news for use in this department.*)

Bridgeport, Conn.—The following gentlemen have recently been elected members of the Automobile Club of Bridgeport: David F. Read, Charles G. Sanford, Louis Newberger, W. C. Bryant, Gregory S. Bryan, Dr. Sydney Bishop and Paul Armitage.

F. W. BOLANDE, Secretary.

Buffalo, N. Y.—The Buffalo Automobile Club has at heart the best interests of automobiling as a sport and has recently adopted an excellent means for obtaining, and compiling in a systematic manner, all useful information pertaining to roads, towns, hotels, etc. In order to systematize this work a form of report has been printed. As many of these as may be necessary can be obtained at the club rooms. The idea is that whenever a run is made those who participate should fill out these reports and then see that they reach the hands of the "Chairman of the Tours and Runs Committee." Whenever a long run is made, say between Buffalo and Rochester, two of these forms might be used. In some cases more than two would be desirable. As information is gathered it will be arranged in suitable form and at the end of each season this will be combined in book form for the use of members only.

As a further inducement a cup has been offered for the member who shall have handed in the greatest number of different reports at the end of the year.

Among other things which these reports are designed to show when filled out, are the following: Time of leaving certain towns and arrival at others; condition of roads; grades; scenery; name of best hotel, and rates; where gasoline can be had weekdays and Sundays; where electric current can be obtained; places worthy of a visit, etc., etc.

Such information as the foregoing will be of immense value and interest to other members and, when intending to take certain runs, by consulting these reports they will obtain information that will enable them to make plans which will insure an agreeable and pleasant journey.

Boston, Mass.—The Massachusetts Automobile Club has just issued its club-book containing names of officers, constitution and by-laws. The officers are as follows: President, J. Ransom Bridge; vice-president, Oakes Ames; second vice-president, Dr. W. A. Rolfe; secretary, L. E. Knott; treasurer, C. J. Rueter. The Board of Governors consists of W. S. Bartlett, E. L. Rueter, E. W. Cate, C. D. Jenkins, Dr. Chas. Swan, Dr. F. L. D. Reist, Newton Crane and J. Campbell.

The following resolution was recently passed by the governors of the Automobile Club of America.

"Whereas, The governors of this club are opposed to excessive speed of automobiles on the highways; it is, therefore,

"Resolved, That all future club runs shall be paced by a pacemaker, to be selected by the Runs and Tours Committee;

"That the pacemaker shall set a pace which shall not exceed the speed allowed by law;

"That should any pacemaker's automobile become disabled he shall appoint the driver of a following automobile as pacemaker, and he in turn, if his automobile becomes disabled, shall appoint the driver of a following automobile as pacemaker, and so on. Any pacemaker appointed by the pacemaker selected by the Runs and Tours Committee or by his successor shall have the same authority as the pacemaker appointed by the committee;

"That the pacemaker shall be distinguished by means of a red band worn on his left arm;

"That should any member of the club pass the pacemaker he shall be suspended, and on a second offense he shall be expelled from the club."

It is expected that the above rule will effectually put an end to the racing which has been indulged in so much on the club runs.

About Amateur and Professional Automobilists

By MALCOLM W. FORD

WITH the increase of the general use of automobiles comes a corresponding variety of styles in running machines by both so-called amateur and professional drivers. Some of those who have taken the sport up recently have displayed surprising aptitude in the way they handle their automobiles. There is just as much difference in controlling the throttle valve, links, steering lever or wheel in the case of a self-propelled carriage as there is in handling the lines of one where a horse is the motive power. There is also a tremendous difference in the range of risk so far as concerns accidents caused by not keeping a proper course, between the horse carriage and the self-propelled one. In the case of the former the animal, so long as no shying or fright takes place, a proper course is kept without much thought or responsibility on the part of the driver ; but with the automobile the wear and tear on the driver's nerves when speeding, unless he is thoroughly hardened to it, makes the risk of accident quite a factor in the run.

It is but natural to expect that one running an automobile continually will become so expert and so used to combating with hostile forces that obstacles of various kinds are met with apparent equanimity. Such a person becomes in time an old campaigner, to use a political expression ; nothing daunts him ; he is so thoroughly used to the results of the slightest movement of the steering gear that no matter how sensitive the machine is in being affected by this part, the driver always feels master of the situation.

Although the fast driving of automobiles has not been engaged in much in America so far, there are a number of users who are able to take a high-speed machine over an ordinary road at a rate of going that would open the eyes of the ordinary layman. These men are found in both of the so-called classes, the amateur and professional. It is but natural to expect that professionals should be able to show great speed without running risk of accident due to unskillful manipulation of the machine ; but there are also a few amateurs in this country who can show professional results in this line.

Taking up the question of what difference there is between an

amateur and a professional automobilist, it may be said that at present there is no settled distinction in classifying them. The only point which governs the question at present is the universally accepted one in all sport, viz., an amateur is one that engages in anything for pleasure, while a professional has some business motive or incentive at the bottom of his participation in the sport. It may be well to mention a few instances where this rule would hardly fit. Mr. Samuel T. Davis, Jr., Treasurer of the Locomobile Company, has a fast steam machine which has generally managed to hold its own on most of the Automobile Club of America runs it has taken part in. Mr. Davis runs his machine solely for the amusement and sociability he finds at these gatherings and in no sense is he a professional automobilist in the way that term is generally applied. Yet he is prominent in the management of a large corporation which makes and sells automobiles, and therefore should the line be strictly drawn he would undoubtedly be classed as a professional.

Mr. Albert C. Bostwick

That is an example on one side, but to show a still more complicated case on the other, that of Mr. Albert C. Bostwick, vice-president of the Automobile Club of America, is interesting. While not holding office in any automobile manufacturing corporation, this gentleman always engages in the sport with the keenness, zest and desire to get in near the first that is only associated with those who make it a business to do so ; yet Mr. Bostwick does not care whether such and such a make of machine which he may be driving shows up well on a club run. He likes to be at the front but the machine is immaterial to him. Those not knowing these facts and only judging by the way he goes in heart and soul, would think that arriving first were a matter of important or vital reputation to him. Other club members that can be put in this

class are David Wolfe Bishop and W. K. Vanderbilt, Jr. They show an intensity in going fast that is at times surprising compared with the comparative lukewarmness of the average autoist. Those of Mr. Bostwick's class display an apparent recklessness that causes no one knowing their characteristics to show surprise when a tire is ripped off or an axle or wheel bent in taking a curve at too much speed. There are only a few other well-known users who can be put in the same class with these men and the probabilities are that the mentioned ones will stand pre-eminent in their particular line for some years. Judging entirely by the way these enthusiasts appear on the road, many would call them professional autoists in every sense, but they are really far removed from that standing. When the sport of automobiling ever reaches a development when it is necessary to positively define the difference between an amateur and a professional, the probabilities are that those like these three celebrated drivers will be just as far removed by law from professionalism as is the case now in the minds of those familiar with the way they appear in automobiles. Just because this class drives a great deal and also fast, and often recklessly, and their names appear often in print as breaking alleged records, causing runaways, etc., is no reason why they should be termed professional autoists.

Returning to Mr. Davis, it may be said that he also is in a class by himself. His case will be difficult to define, for his connection with the manufacturing side of autoing will by rule make him a professional, but the informal way he engages in the practical running of an automobile will seldom cause him to be classed as such. Some others in the Automobile Club of America who may be somewhat similarly situated are Cornelius J. Field, Albert T. Otto, R. H. White, E. T. Birdsall, H. Ward Leonard, James Macnaughtan, Percy Owen, A. L. Riker, Frank Eveland, E. T. Kimball and George B. Adams. These gentlemen are all connected with automobile corporations but none show it in a way to give them the general reputation of being so-called professionals.

Those who are universally known as professional autoists are well represented by Alexander Winton, S. F. Edge, Charles G. Wridgway, Frank T. Craven, George D. Banker, Robert McCurdy, Kenneth A. Skinner, and to mention several abroad, Charles Jarrot, Charron, Fournier, De Knyff, Giradot, Levegh, Voigt. Mr. Winton is a large and important manufacturer and at times does extensive touring and racing. He in a business way, as being at the head of a large company, is on a similar standing with Mr. Davis, but he combines so

strongly the racing, touring and manufacturing elements that he is in popular estimation far removed from amateurdom. The others in this class have little trace of the amateur, they being mostly employed to display machines whether touring or racing.

Having mentioned various points denoting both the difference and similarity in drivers who in some ways are professionals and yet who have strong traits of the amateur, it is timely to describe a class the name of which there can be no doubt, and which in time will constitute the great majority of automobile users. These are ordinary business and professional men, who have no connection with any automobile corporation, except perhaps as stockholders, and who do not do enough automobiling to have the public associate them with the episodes of Messrs. Bostwick, Bishop and Vanderbilt, Jr. These business men do not own the fastest automobiles, nor do they own the slowest. They handle their own machines and engage in the sport almost entirely from the spirit of wishing to get out into the air, and although there are some fast drivers among them, yet these do not show speed often enough to have them considered to be among the representative speed automobilists of the country. In this class are the following : Albert R. Shattuck, J. Dunbar Wright, Colonel John Jacob Astor, George Isham Scott, Dr. Herman B. Baruch, Whitney Lyon, Robert Esterbrook, Oscar L. Richard, Louis R. Adams, Dr. J. Grant Lyman, Dave H. Morris, Winthrop E. Scarritt, J. F. D. Lanier, George B. Goldschmidt, George F. Chamberlin, Dr. E. C. Chamberlin, J. C. McCoy, Harlan W. Whipple, Dr. Edwin B. Sternberger, Robert Graves, Charles J. Glidden, Henry S. Chapin, J. Herbert Carpenter, Stephen H. Tyng, Alan R. Hawley, Bradford B. McGregor, A. W. S. Cochrane, William A. Hall, Samuel H. Valentine, Frank G. Webb, Jefferson Seligman, Isaac Stern, Dr. Truman J. Martin, J. Ransom Bridge, Howard Willetts, S. L. Clayton, Dr. F.

Mr. Winthrop E. Scarritt

L. Sweeny, Arthur K. L. Watson, Charles R. Otis, John Aspinwall and Alfred C. Harmsworth.

Answering a number of requests for an analysis of the way well-known autoists in America handle their machines some conclusions follow : These opinions are in some cases the result of riding alongside of drivers in their own vehicles and merely personal observation in the case of others. Observations have been made on many occasions and under various conditions tending to bring out all the characteristics of the operators, who in turn are alluded to without any regard to professionalism, amateurism or a combination of both. Those mentioned portray about every conceivable manner of traveling along the road in a self-propelled vehicle.

Commencing with the three well-known drivers spoken of before, Mr. Bostwick, Mr. Bishop and Mr. Vanderbilt, Jr., it may be said that all these reveal about the same style of handling automobiles when speeding. Mr. Bostwick knows more about the practical workings of an automobile than the others, but these latter in turn know enough of their Daimler and Panhard-Levassor machines to make them famous as fast travelers. None of these, as a rule, show any regard for the life of the vehicle. They will run them in places that severely test the springs and rigidity and trueness of the axles. The motor of any machine these men drive on a rough road must be in capital shape so far as its fastenings are concerned or this part will surely come to grief. It is unnecessary to say what their tires are compelled to endure. These important adjuncts lead a life of purgatory from a mechanical standpoint. Suffice to say, the machine is handled just as though there were no tires. Their presence is not considered in the slightest way and they are compelled to stand easing the jar for the heavy vehicle they carry at speed over ruts and different shape and sized stones or rocks and perhaps the next minute with brakes put on, they must slide eight or ten feet on macadam, gravel or dirt.

It never would do for those knowing nothing of automobiling and being a little timid about going fast to travel with autoists of this class. They would be in a constant state of apprehension and the ride would be anything than a pleasure. These autoists possess all the characteristics necessary to be fast racers, but they lack somewhat in customs necessary to disabuse the general public's ideas as to the terrors of automobiling. Their machines give out more than do those run by careful drivers, and unfamiliar people are apt to judge superficially by the doings of these men and therefore are badly impressed

with the general subject. Considering everything, however, Mr. Bostwick and his confrères do much general good to the sport. Mr. Bostwick has taken part in races both abroad and in America and his performances have brought out a fearlessness that is generally admired.

The next set of fast drivers who only casually show speed, is composed of the representatives of the high class of manufacturers alluded to before. These men can go just as fast as anyone if they so desire. They have the machines, experience and courage, but fortunately for the general industry and sport of automobiling they have not the everyday enthusiasm. They are able to practically show all sides of the subjects ; in fact, as a class they are unapproached in this line. They are thoroughly acquainted with the mechanical features of their automobiles, easily being able to detect any disarrangement which threatens to mar the smooth running, and in the actual manipulation while traveling at any rate of speed they stand supreme in point of showing ease. Seldom do they take a machine out without adding credit to the industry and engendering enthusiasm on the part of their guests. The most timid person could accompany them on a run and hardly feel at any time that he were in danger. Judgment is used in selecting places for showing speed, and the drivers always erring on the side of safety, use great caution in passing any place where there is even a slight danger of meeting trouble. All of this, however, is to be expected, for who should bring out the fine points of automobiling better than these very men, who as a rule take a broad view and have only the general good of the sport and industry at heart.

The next class which may be termed as general users is in numbers in the huge majority. A glance at the previously mentioned names in this set reveals representative members of it. They tour only from a point of recreation, and although once in a while one of them will become imbued with a desire to show speed, this feeling as a rule does not become dangerously strong. These men are about as familiar with the unpleasant features of automobiling as with the many good and attractive points. No matter what vicissitudes the majority meet with on account of not being thoroughly familiar with the mechanical workings of their machines, they take mishaps with a philosophical air that is most refreshing compared with sentiments that are often expressed by the newer ones who expect wonders out of their machines under all conditions.

In this class can be found plenty who if they desired to could develop into racers showing as much skill and fearlessness as any of the

celebrated professional drivers, but automobiling is not their business, and when it is considered that they handle levers and wheels in a purely recreative way, the ease, finish and general adaptability of many of them cannot fail to be noticed. Observing the way J. Dunbar Wright in his Winton, George Isham Scott in his De Dion-Bouton, Dr. Baruch in any of the several makes which he has driven including the Locomobile and Darracq, Robert Graves in his Locomobile or electric carriage, Dr. Lyman in his Panhard-Levassor, Dave H. Morris in his Mobile, and Henry S. Chapin in his Haynes-Apperson, a capital idea can be obtained of the beauties of driving a self-propelled vehicle. Equally pleasant to watch are Louis R. Adams, Winton; J. Herbert Carpenter, Winton; J. F. D. Lanier, Gasmobile; Whitney Lyon, Electric Vehicle and De Dion-Bouton; Robert Esterbrook, Mobile; J. C. McCoy, Winton; Isaac Stern, Panhard-Levassor; Winthrop E. Scarritt, De Dion-Bouton; Bradford B. McGregor, special Winton; Samuel H. Valentine, De Dion-Bouton; A. W. S. Cochrane, Winton; Jefferson Seligman, Electric Vehicle gasoline, De Dion Bouton and others; Alan R. Hawley, special Winton.

Mr. John Aspinwall

These amateur drivers represent various lengths of time of ownership, but on account of the newness of the sport, none can claim over several years' experience in driving. Some, however, handle levers and wheels like genuine "old-timers." Doctor Lyman will go bounding over the road in his ton and a half French vehicle with apparently as much serenity as though he were sitting in a drawing room. He gave a little exhibition of stopping his heavy automobile at Jericho on the recent run of members of the Automobile Club of America. Those participating in this run and having arrived at the destination were standing around examining each other's machines when the noise of a

Panhard-Levassor was heard, and Doctor Lyman with J. Dunbar Wright alongside of him, was seen coming down the hill in the direction from Oyster Bay, where he had been. He did nothing to stop his machine until he was almost upon the group of automobiles which were standing idly along the road, and then he suddenly acted. The usual creaking, groaning, accompanied by a smell of burning rubber followed, and the big vehicle came to a standstill after a succession of jumps, which generally happens when braking hard on a gravel surface. A few small boulders met with when the wheels were sliding served to increase the height and distance of each jump, but the red-colored distance-killer stopped abruptly after a little skidding which brought one of the rear wheels dangerously close to one of the machines standing still. The whole episode was enlivening although it proved to be a narrow escape from an injured wheel or axle on the part of the machine which Doctor Lyman's automobile gravitated toward just before coming to a full stop. A heavy built vehicle, like Doctor Lyman's, could injure an ordinary automobile very much in a collision, even when traveling very slowly, simply on account of its weight. Doctor Lyman jokingly said that he gaged the distance of his stopping to a hair. It was admitted by those who saw his management that he acted as though he felt he could make the machine answer his will quickly on any occasion,

Mr. J. Dunbar Wright shows a finish in running his Winton that would correspond well with Mr. George R. Read's handling of the reins when on a four-in-hand. Mr. Wright has done a great deal of touring in this country, and intends doing considerable in Europe this summer, he being there now. The probabilities are that no matter what machine he may use in the future, he will show the same aptitude in successfully meeting various conditions that has characterized him in the past.

Mr. Henry S. Chapin manages his Haynes-Apperson blue ribbon surrey like a genuine professional. The fact that he won the Long Island Automobile Club Endurance Test last spring in this carriage is enough to prove that there is little left for him to learn regarding the easy and successful running of this particular machine. One reason for this is that he understands the mechanical features of his automobile. I witnessed an exhibition he gave of starting, stopping, turning quickly, backing on a narrow road with threatening ditches on each side, turning around on this road and gathering momentum again, that simply could not be improved upon, so far as gauging distances and

the absence of unnecessary backing and going forward are concerned. He made his long turning machine respond to his will in the many maneuvers he put it through with no more fuss than though he merely started it off in a straight line.

Mr. Robert Graves is another amateur who is most familiar with the mechanical features of his automobile. As also might be expected, he

H. S. Chapin Just in From a Run

can drive one like a professional. He does not, however, show the same nonchalance when on the driver's seat, as for instance, Mr. Wright, or Mr. J. C. McCoy. Mr. Graves conducts himself more the way Mr. Bostwick, Mr. Adams, or Mr. Scarritt do, they being a little more intent to get much out of the machine. Other amateurs who occupy the driver's seat with an air as though they were satisfied with

the pace and general workings of their machines are Mr. Scott, Mr. Valentine, Mr. Morris, Mr. Hawley, Mr. Esterbrook, Mr. Lyon, Mr. Hall, and Mr. Kimball. The doings of all these men are in great contrast to the many impressions caused by published statements of alleged happenings and accidents to automobilists in general. These daily press stories, while sometimes being true, are often elaborated upon in a way to reflect discreditably upon both the automobile and the driver concerned in the episode. Plenty of automobilists can be found who, through inexperience and losing their heads, bring about damage to their own and others' machines. This class also shows impatience at any failure on the part of the automobile to fulfil their expectations, but compared with the growing number who are able to get good results and thereby make automobiling enjoyable, they are largely in the minority.

General Electric Motors

THE General Electric Company has recently placed on the market two new automobile motors which will be known as the GE–1004 and GE–1005 ; these motors while operating at high efficiency under full loads are particularly designed to maintain a very high efficiency at heavy overloads. The effect of this is to favor the battery at a period when economy in current consumption is of the most supreme importance ; viz., when it is being temporarily overtaxed in urging the carriage through snow, mud, sand or up heavy grades. It follows from this that batteries used with these motors are not overworked to nearly so great an extent, when producing a given torque from the motor, as batteries used in connection with motors whose economy characteristics drop sharply on heavy overloads.

The new motors are waterproof, and are provided with self-oiling bearings ; they can be interchangeably mounted on the vehicle either on the right or the left, in front of or behind the axle. The brushes and brush holder mechanism are readily accessible for inspection and repair, while the armatures and field coils can be removed quickly by simply loosening a few bolts.

The GE–1004 is designed for a continuous output of about 2 horse-power, being wound for 85 volts and 10 amperes, while the GE–1005 is designed for a continuous output of about 1½ horse-power, being wound for 85 volts and 16 amperes. Both motors will give twice their rated output for a half-hour and two and a half times their rated output for a short period without undue injury from sparking or heating.

Of Passing Interest

The automobile has a place on the Pan-American stamp. It is bound to stick now.— *Worcester Telegram.*

The Locomobile Company of America has removed its principal New York office from 11 Broadway, to the Transit Building, 7 East Forty-second Street.

The latest in the way of postal cards comes to us from Italy. This card has on the upper left hand corner a neat illustration of the sender seated in his automobile. Perhaps the idea is old, but this is the first time we have seen it.

The Commissioners of Golden Gate Park, San Francisco, have given certificates to fifteen owners of automobiles. These certificates entitle them to drive their motor vehicles within the park limits. This privilege is granted to pleasure carriages only.

Gormier, of France, the well-known motocyclist, recently covered a distance of 168 miles with the consumption of but a trifle over three gallons of gasoline, at a total cost of 39 cents for the trip. He drove a De Dion quadricycle fitted with a 2¾ horse-power motor.

The Quaker City Automobile Company have recently purchased the business and location of Maurice Loeb at 306 North Broad Street, and have secured the agency for Philadelphia and vicinity of Duryea vehicles, which they intend making their leader in the gasoline line.

It is quite noticeable the growing popularity of light steam carriages over in England. One of the latest American companies to introduce this rightly popular style of vehicle is the Milwaukee Automobile Company. These machines are being received very favorably in England.

Mr. Bostwick's persuasive powers were not sufficient to lead the police officials to arrest him when he drove his gasoline machine through Central Park a few Saturdays ago. The gentleman in question certainly tried to enjoy the experience of "being under arrest," but the authorities would not bite. It is doubtful if they ever will.

People acquainted with the power developed by horseless carriages have found out that a mechanical horse-power is not so efficient in tractive power as a living horse. The *Engineer* of London says that various trials have demonstrated that a mechanical horse-power is in practice equivalent to about one-fifth a flesh-and-blood-and-nervous-energy horse-power.

We have lately inspected a number of different makes of automobiles with tonneau bodies and have been struck by the generally small proportion of the space for the occupants of the rear seats. This cramping of passengers is not a good thing by any means. It certainly would pay builders to see that seats are plenty large enough to warrant comfort while riding.

The following advertisement is kept standing in some of the English newspapers: "If your horse be restive in passing motors, give him a good drive, and then bring the animal to the King's Arms Yard, and give him a feed close to the motor, which will be kept in action every Monday from 8.30 to 12 a. m. The charge is nothing." It is an ill wind that blows nobody good.

We have received prospectus of the Canadian Steam Carriage Company, the authorized capital of which is $250,000. The company has been organized for the purpose of manufacturing automobiles in various styles. It is the owner of valuable patents. The intention is to erect a factory at London, Ontario, which it is stated will be equipped with the most modern machinery. Further particulars can be obtained from John H. Jewell & Co., 5 West King Street, Toronto.

The Patee Bicycle Company of Indianapolis, Ind., have tested one of the Loomis carbureters made by the Loomis Automobile Company, Westfield, Mass., to the extent of 5,000 miles on one of their motor cycles, and were so much pleased with the device that they placed an order for 500. It is noticed that the Patee Company are sparing no expense to make their motor cycle the slickest thing out, for the Loomis is the most expensive carbureter on the market. The Patee Company are filled with orders.

The Nathan Manufacturing Company, of 92 Liberty Street, New York, the well-known manufacturers of steam specialties, is placing on the market a self-acting lubricator for use on steam engines. The action is as follows: While the machinery is in motion steam passes through a center tube to the upper part of the lubricator, where it condenses. The water produced by this condensation, being heavier than the oil, sinks to the bottom of the cup, raising a corresponding amount of the lubricant upward and causing it to overflow, through the open top of said center tube, to the parts where lubrication is required. The same company makes sight-feed oilers for use on gas, gasoline and oil engines.

Beginning with the last issue the "L. A. W. Magazine" was issued as the "Good Roads Magazine." The owners have already purchased the good will and subscription list of the magazine called the "Road Maker," and are now negotiating with the largest good roads organization in the country to have the "Good Roads Magazine" adopted as its official organ. The "Good Roads Magazine" will be edited by the foremost good roads advocates in the country. Its pages will be filled with attractive reading matter and illustrations. It will, of course, be retained as the official organ of the League of American Wheelman, the pioneer good roads worker of the country. After July 1st the entire business will be removed to New York City, the business and news center of the world, thus securing for the magazine every facility and advantage to benefit advertisers and readers.

(We desire those interested in both the manufacture and operation of Automobiles to send in for use, in this department, whatever they think may be of interest to us or our readers.—EDITORS.)

Storing of Gasoline

REGARDING the care of gasoline, my story is a short one, and can be told in few words. I procured a strong galvanized iron tank having a capacity of 120 gallons. Into one side of this I inserted three pipes; one an inch and a quarter in diameter, through which, by means of a funnel and an ordinary oil pump the gasoline is drawn from the barrel and conveyed into the tank,

Near this is a small quarter-inch pipe. Then a three-quarters-inch pipe extending down within half an inch of the bottom of the tank. All three of these pipes are screwed in, and made secure against leakage under pressure, and each has a globe valve selected and tested with care to make sure that it is perfect and will not leak under pressure.

I then buried this tank about eighteen (18) inches under ground in front of my stable, the aforesaid pipes being long enough to extend up six or eight inches above the surface.

A piece of rubber hose is attached to the three-quarter-inch gasoline pipe, and a box with hinged cover on top, with hasp and staple for lock, encloses all these pipes.

Into this tank I put two barrels (something over a hundred gallons) of gasoline at one filling. When I wish to draw out gasoline, I simply attach an ordinary bicycle pump to the air pipe and force air into the tank until the gasoline runs out. This is quickly and easily done, and the entire arrangement is found to be both a safe and convenient way of caring for gasoline, and is secure against a possibility of waste by evaporation, provided the valves are kept closed when not in use, and the enclosing box kept securely locked.

YONKERS, N. Y. CHARLES R. OTIS.

Lubricating Oil for Gasoline Motors

IN regard to smoke and smell from some makes of gasoline automobiles, it is due to several reasons. One of the causes is imperfect combustion, and another is due to the grade of lubricating oil used, or to both causes. The first of the two causes is due to the defects in the type of carbureter or vaporizer, and in the method of control and handling same.

The second cause is due to the poor grade of lubricating oil, which is sometimes used on gasoline machines. The average engine lubricating oil which is said to be good for this purpose is not fit for it at all. It is a compounded oil, and one in which animal fat is compounded. The only grade that we have found suitable is one that we have had specially prepared for the De Dion Company. It is a pure mineral compounded oil, and is especially suited, from long experience, for the high temperature and low pressure existing in the gasoline type of motor, and is the only one which leaves no smell or sediment after its use, and keeps the cylinder in good condition.

BROOKLYN, N. Y. C. J. FIELD.

Our experience regarding the smoke and smell from automobiles, is that it comes from two causes. The first and most prevalent is that of bad lubricating oil and too much of it, as the best of it will cause smoke from the exhaust, if it is fed in too great quantities. The smell is generally caused by insufficient combustion or poor ignition. The most desirable oil to use is one of high fire test combined with considerable viscosity. As to the oil's boiling point, we cannot speak. Of such oils as we have used, having found this to vary in oil that has given us good satisfaction, and again when oil might be satisfactory on one machine it is not satisfactory when used on a different type or high speed engine. We have found, however, in our experience that most any good oil with above mentioned quality will work satisfactorily in a properly made engine, and without smoke if user is careful to adjust his feed properly, and as the people are becoming more acquainted with this, we have found considerably less trouble from point mentioned.

ST. LOUIS, MO. JOHN L. FRENCH.

A Visit to the Daimler Company of Coventry

A VISIT to the Daimler Company a few days ago revealed the fact that they are exceptionally busy just now. Orders were pouring in every day, and large as is the staff and number of men employed, they hardly know how to get through the work in hand. There is no doubt that at last the British public is beginning to recognize the usefulness of the autocar. As a nation, we are curiously slow-moving, and the national mind is not receptive as a whole; but once get an idea firmly implanted and it is there forever. Every year sees immense strides in the industry of self-propelled vehicles. As the demand arises, so do the large firms exert themselves to keep pace with it. Ever since the inception of the movement, the Daimler Company has earned a great reputation for reliability and good workmanship. Their engine is the same as used by the celebrated house of Panhard & Levassor, and produces equally good results. Up to the last twelve months, however, the Coventry firm has been turning out strong, solidly-constructed, but under horse-powered cars. Their 6 horse-power Parisian became almost a standard pattern, from which they exhibited a certain reluctance to depart. Several of these well-known vehicles competed in the 1,000-mile trial of 1900, and, although they performed with consistent merit, still they were not conspicuous for speed. The carriage part was in fact too heavy for the engine. In the short space of one year the firm has made a marvelous advance. Intending purchasers have no longer cause to complain of non-variety of pattern. A very wide range is now offered for their selection. Engines are being manufactured of 6, 8, 10, 12, 16, 20 and 24 horse-power. Any type of body can be fitted and with an increase of power there is a notable diminution in weight. Aluminum now plays a very large part in the carriage department, and all over the country English cars are gradually acquiring the rakish, symmetrical lines possessed by the French ones. Height is lowered, wheel bases lengthened, flimsy bicycle wheels are disappearing, and much more attention is bestowed upon detail.

Hitherto, the small cars of the Daimler have not been altogether so successful as their heavier vehicles. The appearance of the Critchley was awaited with intense interest, but it failed to realize expectations. The belts slipped, many people took objection to the side-steering, and although it paved the way for future improvements, it did not prove an unqualified success. It was followed only as lately

as last year by the Kimberley—a car neat in appearance and possessing an excellent engine, but with the same form of transmission as its predecessor. Not content with their efforts, however, the Daimler Company has now gone in for a fresh departure, and it was our privilege while there to be shown the drawings and working parts of an entirely new voiturette, which they hope to be able to place on the market toward the end of June. As an enthusiastic employé observed, "it will be a real little beauty." From what we saw, we believe that ere long the public will endorse the statement.

The new voiturette will be furnished with a 6 horse-power engine, developing 7 on the brake. It has three speeds and reverse, the gear being exceptionally well constructed. A noticeable improvement is that all the bearings on the main shaft are easily adjusted by a thumb screw. Any play can thus at once be taken up. In addition, each bearing is enclosed in a dust and mud proof aluminum case. The drive is by a live axle, exceedingly strong, and the differential and vital parts are completely encased. Thus, the car can be used in the worst of weather. The top speed is calculated to give about 22 miles an hour normal, over 25 when the accelerator is requisitioned. The favorite tonneau body will be fitted, and altogether we shall be much deceived if the firm does not greatly add to its already high reputation by the new voiturette. The price at which it can be brought out is not yet fixed. If it be reasonable, we predict an enormous sale. The little vehicles are not geared too high, the aim of the makers being to produce a light car, which, like the De Dion, will take all ordinary hills on the top speed. The writer was promised a trial as soon as the voiturette was completed, and entertains little doubt but what her good impressions will be confirmed. Both tube and electric ignition are fitted.

On the large cars of 16 and 20 horse-power the company has a very clever device for preventing the band brakes firing. A tap is turned, which directs a stream of cold water to the inside of the brake.

In the repair shop we were shown many magnificent vehicles. One belonging to the Duc De Teano had been in constant service for three years, and all things considered showed very little signs of wear. An old friend was the 12 horse-power car, lately driven by Mr. Montagu Grahame White, a well-known autocarist. Mr. Ernest Owers was carrying off in triumph a splendid 18 horse-power phaeton, with hood and special arrangements for luggage. A more beautifully fitted car we have seldom seen. We were much indebted to Mr. Foster Pedley

for his kindness and courtesy in showing us over the works, and it was gratifying to perceive the activity that reigned in every department and the increasing enterprise displayed by this firm of renown. That they are producing thoroughly up-to-date vehicles, well built, well constructed and well designed, even the veriest tyro could not fail to perceive.

MARKET HARBORO, ENGLAND. MARY E. KENNARD.

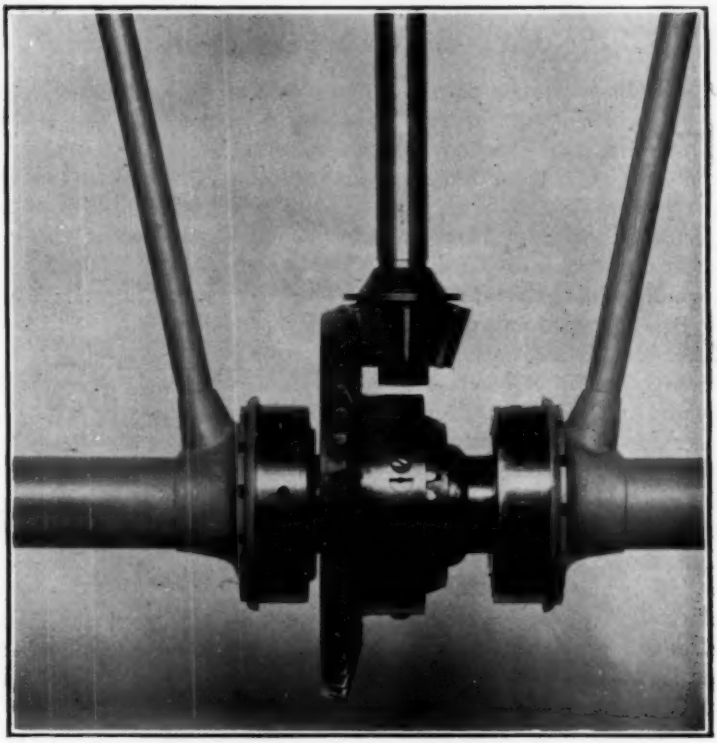
Chainless Transmission Gear

THERE is one part of every automobile which interests almost all who have to do with motor carriages; that is the arrangement of the mechanism which transmits the power from the motor to the road wheels; the transmission gear. The method of transmitting this power from the engine to the wheels is a very important thing to consider in the building of automobiles. There are those who would not hear of anything being used but a chain; others again claim that a belt drive is the most efficient. However, both systems have their disadvantages.

Century Steam Carriage

With the introduction of the chainless bicycle came the demand for and subsequent supply of gear cutting machines which made it possible to produce "chainless" wheels at reasonably low prices. At first the gears as cut were not the most satisfactory, and considerable trouble and annoyance were caused to the first purchasers. To-day, however, machinery for cutting spur and bevel gears which are scientifically and mechanically correct is quite plentiful.

Recognizing this, the Century Motor Vehicle Company, of Syracuse, N. Y., decided to build "chainless automobiles." Although the wear upon teeth of gears cut upon modern machines is very little it is especially important to have perfect alignment. The Century Company mounts the large bevel gear upon a shaft which runs



Chainless Transmission Gear

through rear axle as shown. This illustration will be easily understood. While the carriage is running all gears are encased, thus making them dust and dirt proof. The drive is very direct and effective. The small driving pinion is held in position by the gear case, the casing which surrounds the driving shaft acting as a distance piece between pinion and engine. It will be seen that all parts

are kept amply rigid by means of suitable brackets. This rigidity ensures smoothness of running and reduces friction which would otherwise be considerable through springing.

So far, the results this company has secured with this form of drive have been eminently satisfactory.

The Electric Cab Service of Paris

THE question of transportation of passengers in our cities is one which always arouses considerable interest. It is a subject that has been given much attention in most of our large centers of population. In some instances the electric cabs used for the purpose have failed to give the service the shareholders had expected they would. There may be numerous reasons for this, but such is the fact. In connection with this subject perhaps a few facts regarding the electric cab service of the city of Paris will be of interest.

In a recent number of Fielden's Magazine, Mr. H. E. P. Cottrell takes up this subject in a very exhaustive manner, and below are given a few abstracts from his valuable contribution. It would neither be practicable nor possible to reprint all he had to say in the article referred to, and we must confine ourselves to the salient points.

The author starts out by saying that so far as Paris is concerned, the use of electric vehicles for transportation of passengers is comparatively old, dating as far back as 1894. At that time the Compagnie Generale des Voitures á Paris cast about for some practical method of replacing horse traction. Considerable difficulty was experienced in obtaining a sufficient supply of suitable horses. Their liability to diseases of an epidemic character, and the low average working life of the Parisian cab horse (about two and one-half years), not to speak of the feed question, are, collectively, quite sufficient to induce any public company to experiment in directions promising relief from such a perilous situation.

Two thousand three hundred and ninety-two of the company's horses died of glanders alone in 1896, costing in the neighborhood of $340,000.

Mr. Bixio, who was at that time managing director, had a cab constructed. This was of the "Mylora" type. Excellent results were obtained, and in 1897 another step was taken when the Livery Cab Company imported four specimen cabs from England. In the Public Cab Competition, June, 1898, one of these machines made an

excellent showing, leading parties interested to feel that electric motors were better suited for use in cities for that particular service, and the General Cab Company adopted the electric automobile cab on a large scale. One hundred cabs were ordered at once. A station was erected at Aubervilliers, about five miles from the grand opera. The equipment for this plant consisted of two 250 horse-power engines, driving by belting two generators of 1,250 amperes capacity, at 120 volts, to deliver the current at 159 charging points distributed over three charging sheds. Accommodation was provided for 250 cabs.

The type of cab finally adopted by the company was the subject of careful consideration. It was at first proposed to substitute a motor truck with one or two wheels for the horse, and place it in front of cab. The second proposal was to have a single type of motor frame which could take closed or open bodies, exchangeable according to season. This latter plan was followed.

The company had some difficulty in the matter of accumulators; this trouble still exists; all accumulators so far are more or less defective from the view point of weight, bulk, initial cost and maintenance. The original Planté type, though fairly suitable for tramway work, where there is little variation in the rate of withdrawal of current, and where the permanent way subjects the accumulators to a minimum of shaking and shocks, does not at all suit vehicles working over the ever-varying, uneven surface of an ordinary street, or the abrupt changes of direction and speed required by an ordinary cab service. Their charging capacity is also too low for vehicles which have to cover at least the same distance as a horse (say 50 to 60 kilometers— 32 to 37½ miles) would be expected to do, without recharging. A low cost of up-keep is also imperative as some set-off against the depreciation and wear and tear of rubber tires which are indispensable to the life of both accumulators and motors, so that it was soon found impracticable to use the Planté type unmodified. Blot-Fulmen accumulators were chosen for the work. The capacity of a battery of 43 of these accumulators in series, used in an ordinary electric cab is from 60 to 70 kilometers (37 to 43 miles) at about 15 kilometers (9½ miles) per hour. All these accumulators being of the added oxyde type, it is most essential to their length of life that they should not be at any time wholly exhausted in service, otherwise the plates suffer and the batteries cannot take the standard charge.

The following table gives the distribution of weight in these cabs when in working order under service conditions:

Nature of load	ITEMS	WEIGHTS				CONCENTRATED ON				Remarks
		Partials		Totals		Front Wheels Idlers		Back Wheels Drivers		
		Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct	Lbs.	Per ct.	
Non-Paying	Carriage	2667.60	59.60		52.29					The load on Idlers equals 52% of the load on Drivers.
	Driver	154.35	3.46		3.04					
	Accumulators	1653.42	36.94		32.37					
			100.00	4475.47	87.20	1543.23	30.30	2998.28	56.90	
Paying	4 Pass'rs			617.20	12.80	220.46	4.33	330.70	8.47	
			Totals	5092 67	100.00	1763.69	34.63	3328.98	65.37	

It will be observed that the rates of paying load to non-paying load is as one to seven, and that the load on the idlers is as four to seven (nearly) both of which ratios are distinctly unfavorable. This, however, is unavoidable in the type of carriage which has been adopted, and will, no doubt, be adhered to until the public taste is educated up to a more suitable form by the evolution of the automobile of the future.

The motors used are of the Lundell-Johnson type, with four poles, excited in series and two collectors. The motors weigh about 211 pounds, and develop 3½ horse-power at 1,500 revolutions, which corresponds to a speed of 10 miles per hour. Raw hide pinions are used. It is noticeable to anyone that the noise caused by the Paris electric cabs is far less objectionable in quantity and quality than that of their London compeers used to be. This is claimed to be due to the raw hide gearing used.

The sprockets are provided with checks which prevent the chain from running off. These checks, however, do not cover the bottom of teeth, so that space is left for dirt and moisture to drop out.

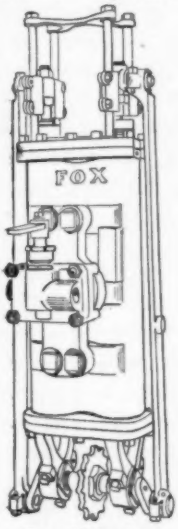
The cabs are well provided with brakes, two electric, a friction brake and a block brake. From the point of view of the Parisian public three circumstances have militated against the popularity of the electric cab. First, the difficulty of obtaining them ; the excessive fares charged—these have been two or three times the ordinary one-horse cab fare ; and, thirdly, the risk of accumulators giving out when a trip to the suburbs is in progress.

The sole causes of dissatisfaction with the Parisian electric cabs are wholly connected with the question of recharging the batteries, and the operation involved thereby.

The successful adaptation of electric traction to automobiles and cabs depends chiefly on the judicious multiplication of charging stations, and their location at convenient sites in the principal districts of capital cities and towns along the main highway arteries. Paris, which is generally so well supplied with most conveniences connected with automobiles, in addition the sub-charging station previously mentioned, only possesses one more station, more or less open to the public.

The Fox Steam Engine

STEAM carriage builders are always on the lookout for new and more efficient engines for automobile work. The Rochester Steam Motor Works, Rochester, N. Y., are now building steam engines which possess several new features. We take pleasure in presenting to our readers some facts regarding the Fox Valveless Steam Engine as made by the company named.



Fox Valveless Steam Engine

The principle under which the motor operates is that one piston and cylinder operate as a slide valve and steam chest for the opposite one, and *vice versa*. Under a careful brake test this engine has developed more power on a smaller consumption of water than the engines generally used on modern steam carriages. The piston is eleven inches long, and the stroke three inches.

It will be noticed that the piston rods, cross heads, etc., are at the top of the engine which would bring them under the seat of an automobile, away from the mud and dust of the road. This also places all of the strain from chain and sprocket wheel on the end opposite from the working parts, which is very advantageous. In the event of packing blowing out the stuffing boxes are easily accessible from the floor of the wagon, avoiding the possibility of lying on your back under the wagon as is the case under other constructions.

Paris-Bordeaux Race

THE most wonderful long-distance speed automobile performance yet credited to anyone, was made by Henri Fournier, winner of the 1901 Paris-Bordeaux race, held May 29. The 348 miles were made in 8 hours, 44 minutes and 44 seconds, or equal to a rate of speed which would take the winner from New York to Buffalo in a trifle over 10 hours. Had Fournier not been forced to limit his speed to 12 kilometers an hour in passing through Versailles, Chartres, Chateaudun, Vendome, Tours, Chatellerault, Poitiers, Ruffic, Augouleme and Libourne, he would have made an average speed which would have taken him from New York to Buffalo in 7 hours, or at a rate of speed considerably faster than the world-famed Empire State Express travels. There is no question that at some parts of the journey Fournier went somewhat over 70 miles per hour. His 330 miles outside of towns were made at an average rate of 53 miles per hour, and the average of the whole distance, including the slowing up through towns, was over 40 miles per hour.

The previous record for this race was held by Charron, his time being 11 hours, 4 minutes and 20 seconds. It will be seen that Fournier reduced these figures by nearly three hours. The second arrival was Farman in a Panhard-Levassor in 9 hours and 40 minutes, while the third man, Voigt, who also operated a Panhard-Levassor, was third in 9 hours, 49 minutes and 11 seconds, both beating Charron's record.

The race for the Gordon-Bennett cup was held at the same time, but it ended disastrously on account of an accident. The starters in this race were Charron, Levegh and Girardot. The two first named collided and were unable to finish, and their only competitor, Girardot, had a walk-over, finishing eighth on the list of the other race, his performance being completely overshadowed by Fournier's. Charron was the favorite for both races, for he had tested his machine previously over a distance long enough to show what it could do, he having made 112 miles in 2 hours and 10 minutes. It is most probable that had he not been thrown out of the contest through adverse circumstances, he would have won both races, for he had the necessary machine and has always shown the ability to get all the speed and power out of any automobile he has heretofore driven.

Unfortunately the Paris-Bordeaux race was not international in character on account of the disqualification of the only English entry on a technicality, and also the withdrawal of the only German entry. The Englishman, S. F. Edge, was ready with a 70 horse-power Napier, but was not allowed to start on account of his having made a change of tires at the last moment due, it is said, to a puncture. The terms of the race are that the competing machines must be made wholly in the country they represent and therefore French tires on a machine representing England made the vehicle ineligible. Just what a 70 horse-power Napier would have done against a 24 horse-power Panhard would have been interesting to note. Englishmen have been leaning toward very high-powered motors for some months, but none have yet had a good test against other machines in a race. Fournier's vehicle in exterior appearance is very similar to other racers such as the Napier and Panhard-Levassor. The only difference in these celebrated machines is in details of mechanism which have no particular bearing on the life or speed of the vehicle, they being mostly the result of the individual ideas in the shops where they are constructed. It has been noticed that all racing machines are growing like each other in outward appearance.

A little analysis of the performances of the three first men in the recent French race cannot fail to show their unusual merit. Guiding an automobile on a country road at a rate of speed shown by the three leaders requires an amount of courage that cannot be appreciated by the ordinary man. Coincidences are met with unexpectedly that summon immediately all a driver's nerve and knowledge of manipulation to have him successfully pass the danger. Railroad engineers often describe how they and their comrades have handled locomotives under various circumstances, but their experiences, exciting as many have been, are destined to be thrown in the shade by the many that high speed autoists will in time speak of. When one considers what a tremendous force stored up an automobile is weighing a ton or more going at the rate of anywhere from 40 to 70 miles per hour, and that there are no well laid steel rails to keep it on a clear course and that there is nothing but the driver's hand, which in turn is controlled by his nerve, to prevent this terrible combination of weight and speed from being ditched, the fearful risk may be appreciated. An automobile traveling at the speed which many are able to do, meeting with a slight obstruction or enough to swerve it from a true course would not turn over the way so many horse drawn vehicles do and slide a few

feet and stay there with nothing injured or deranged, besides perhaps a wheel or part of the body. A heavy self propelled vehicle traveling at 60 miles per hour would perform enough gyrations in turning over before its momentum had been stopped to make it almost impossible for its occupants to escape without mortal injury. The machine might roll over on a level road three or four times, sideways or once or twice if it turned a front summersault. It would be so battered that few parts of it could be used again. Its own weight would exert such a force in destroying it that the wreckage would be almost complete.

So far there have been no accidents of this kind to speak of, most mishaps having happened when the machine was going comparatively slowly. The result of these, however, cannot fail to be convincing of what would happen were the machine going 60 miles in place of 20 miles per hour. When all this is considered no surprise need be shown when a driver making such a speed record as Fournier's is looked upon as a hero. Forced as he was in many places to send his machine over the country road at a rate much faster than a mile a minute, Fournier proved that he possesses abilities which few men can hope to have. Nothing like his French performance has been done in this country and it is not likely that a corresponding one of such a distance will be seen here for many years, if ever.

As showing the manner in which the time each year in this race has been cut down it may be interesting to add that in 1895 Levassor took 22 hours and 25 minutes to cover the course; in 1898 Rene de Knyff's time was 15 hours and 15 minutes; in 1899 Charron took 11 hours, 4 minutes and 20 seconds, and now here comes Fournier who cuts it down nearly 3 hours.

New Electric Stage Lines; Storage Batteries

THE almost simultaneous announcement of an improved storage battery brought out by Mr. Thomas A. Edison and the inauguration of a new service of electric stages by the New York Electric Vehicle Transportation Company, has attracted extra attention to the storage battery. Mr. Edison's battery is something that the mechanical world will expect to hear more about; until it is brought out commercially the good points claimed for it will be taken skeptically. But the new stages can easily be pictured as being a reality. In a conversation with Mr. Henry Sanderson, president of the transportation company, the following facts were learned about this important innovation:

On or about August 1 twelve automobile stages, capable of making 10 miles an hour exclusive of stops, are to be put in operation, and the number will be added to as quickly as possible. The routes will aggregate about 22 miles, the whole system being an extension of the Fifth Avenue Stage Line. The new stages will seat thirty-four passengers and will have room enough in the aisle for persons to comfortably walk between the two rows of seated passengers. The roof will be high enough for a 6-foot man to walk upright with a silk hat.

The routes are as follows: The Fifth Avenue Stages are to be run on up the avenue to One Hundred and Thirty-fifth Street, with transfers east in Seventy-second Street to First Avenue, and west through the Park and the West Seventy-second Street Parkway to the foot of Riverside Drive. Another line of the stages is to branch off Fifth Avenue at Fifty-seventh Street, running thence to Broadway, to Seventy-second Street, to Riverside Drive and up through Riverside Park to One Hundred and Tenth Street. Here the line divides. One branch of it is to go on through Riverside Park and over the Manhattanville viaduct, turning into One Hundred and Thirty-fifth Street and stopping at Broadway. The other branch turns eastward into One Hundred and Tenth Street, or Cathedral Parkway, and runs across to Fifth Avenue; but with a long and important loop it turns northward again at Manhattan Avenue and runs to One Hundred and Fifty-fifth Street, thence eastward to Macomb's Dam Lane, which it follows to Central Bridge, returning by Seventh Avenue to One Hundred and Tenth Street.

It will be seen from the above that some routes are through picturesque surroundings, and even with the fare at 10 cents the new vehicles will undoubtedly attract many passengers who are bent more on having an outing than in reaching an objective point. Without discussing the business side of the proposition, for the success of that is yet to be determined, it is very probable that many passengers will use the new stages who otherwise would not occupy a seat of the present kind drawn by horses. The inauguration of this new service has only been made possible because a battery called the "Exide" has been thoroughly tested and found satisfactory. It is a development, Mr. Sanderson said, of the pasted plate type of lead battery, having been worked out by the Storage Battery Company, of Philadelphia. They have revealed a radius of action of about 40 miles in these heavy stages with one charging.

The scientific figures given by Mr. Sanderson are that this battery weighs 62 pounds per electric horse-power hour, which is the best record yet of any battery found to be commercially successful. Mr. Edison's new battery weighs according to the inventor's estimates, a trifle over 53 pounds per electric horse-power hour, and, as Mr. Sanderson says, if it should be found to give better results than the present "Exide" type of his company's, he will assuredly use Mr. Edison's. All arrangements, however, are made for using the "Exide," for they have been found to give results satisfactory enough to greatly increase the range and service of the stage line.

The writer interviewed several well-known authorities on electrical matters regarding Mr. Edison's battery, and the opinions received are not so enthusiastic as were the announcements emanating from the laboratory. The battery consists of a positive steel plate and a negative oxide of nickel plate immersed in caustic potash or lye. This combination is not new but, as the writer was informed, it may be that Mr. Edison has greatly improved the workings of these metals so that unusually good results are obtained. Its deterioration in commercial use is yet to be determined, and this is an important feature, for it is the only test that business people will notice. Its invalid qualities are also unknown. Another bad feature for the commercial success of the battery is that the nickel for the negative plate will be costly. Taking everything into consideration, the general opinion is that even though Mr. Edison's battery may be the best yet brought out, few will be influenced by what is claimed for it until it has been found that the results are obtained from practical usage.

Latest French Cars

WE have just received a letter from Mr. Mark Mayhew, who is recognized as one of the most ardent and enthusiastic members of the Automobile Club of Great Britain and Ireland. With this communication he sends us a copy of "Automobile Club Notes and Notices," to which he contributes some impressions of his recent ride to Nice. We quote such of these as are likely to interest our readers. Mr. Mayhew was recently returned to the London Council, most of his canvassing and speech-making being carried out by the aid of automobiles.

Starting on Wednesday, March 6, on my 16 horse-power Napier, with my friend Mr. Arthur Russell, my mechanic and baggage on board, I drove to Southampton, crossed to Havre, and then on to Paris on Thursday.

The next day we started for Bordeaux traveling by way of Orleans, Tours, Poitiers, arriving at Bordeaux on Sunday. Leaving Bordeaux on Tuesday, 12th March, we traveled by Carcassonne, Montpelier, Marseilles to Nice, where we arrived on Friday.

Our journey had been absolutely without incident, excepting two punctures. With fine but cold weather, the most magnificent roads in the world (excepting the last part of the journey), and the car always traveling very well, we had the most enjoyable run I have ever experienced. There was never the slightest trouble with the engine or any part of the car beyond a slight sinking of the back springs. But it is of what I saw at Nice I wish more particularly to write. We found collected in the Garage of the Automobile Club of Nice, probably the best and most powerful of all the cars that existed in the different parts of Europe, they having made Nice their rendezvous for the race week.

The most noticeable point perhaps from an Englishman's view was not so much the engine-power of the cars as their remarkable lightness. Taking for instance the most successful machines in the races, the "Mercedes" or new type of Canstatt Daimler, we found an engine of about 35 or 40 horse-power, a long car with very comfortable accommodation which in racing rig weighs slightly over one ton and for tourist purposes about 2,200 pounds. Five of these started

in the *vitesse* and tourist races over very difficult, dangerous, mountainous rough roads—and came back without mishap.

It is said that the English Daimler Company has the right to the drawings and particulars of all cars made by the Cannstatt firm. If this be so, and if the new board of the English Daimler Company is awake, it is to be hoped that they will instruct their engineers to turn out a complete copy of the "Mercedes," and thus take advantage of the brains and money which have been expended on these cars.

The latest manufactured type of Panhard is 20 horse-power nominal, said to produce about 30 horse-power on the brake. These cars weigh under a ton in racing *carrosserie*, and are supplied with change of speed and direction all on one lever, startlingly small gear, and a few improvements in the usual type of engine. Their speed was considerable, but not so great as the "Mercedes" owing to the smaller engine.

There were one or two big Mors carriages of not less than 45 brake horse-power, which were probably really the fastest cars there. The failure of Mors and Panhard in the races was undoubtedly due very largely to a number of little mishaps, such as slipping clutches, troublesome pumps, etc., which might easily have been avoided by more care on the part of the makers in turning them out, and by their owners by trying them thoroughly before the start.

Rochet-Schneider have brought out an extremely well made 24 horse-power car which does them great credit and looks as if it would last. I understand the price is very reasonable compared with the more fashionable firms.

So much for the big cars. Now let me notice the voiturettes. The most noticeable is the 12 horse-power racing Darracq, a mere skeleton with a huge engine, very noisy but extremely fast. It would have astonished some of our chauffeurs to have seen these little monsters tear up the steep sides of La Turbie. Then there were the little Peugeots, both racing and tourist, with four wheels of the same size, bicycle pattern and electric ignition. But the engine is still in the rear as in the old types.

The big racing Renault did not show up. Among the promenade voiturettes nothing could be prettier or more satisfactory than the little 6 horse-power Darracq with its elegant bonnet, and the 10 horse-power Mors with perfectly charming carriage work. The De Dion voiturette still seems very popular but I saw many more Darracqs.

But I could not see all of these magnificent automobiles without drawing some important conclusions and making a few remarks upon some of their peculiarities. Their great feature is unquestionably their lightness. This in itself does away with the need for so much strength, as the cars bob over lumps and bad places such as *caniveaux* in the road like a cork instead of dashing against or crashing into them as is inevitably the case with a heavy car.

The result of this is that in springs and tires there is an enormous saving. In order to illustrate here what is being done in France and also to get further experience myself, I bought a 20 horse-power Panhard just out of the works which had been sent to Nice, and drove it home. The tires would surprise anyone who examined them, being practically without cuts, the tread being worn to a nice fine sand-paper surface all the way round after a journey of 1,000 miles. Another point which is being made much of by the continental manufacturers is the power of the foot-brake. This can be relied upon to *stop* the car under almost any circumstances, so that one may go at pretty well full speed down a winding mountain road and pull up easily for turning the bends.

To compare the fitting, however, of the foreign cars with that of the English would be, in my opinion, decidedly in favor of those produced by our manufacturers. Much more care appears to be taken before the English car leaves the shops. It is also necessary to point out that the racing cars I have spoken of are not expected to go through more than two or three long races. A big overhaul would be necessary after each long race, and future purchasers know, or at least find out afterward, that they require a great deal of attention.

I have great hopes that an English car will do well in the Gordon-Bennett race of 1902; but as regards 1901 I fear we are on the wrong track in building heavy cars.

But still the fact remains that they produce a faster article than we have been able to here at present, and I think this is largely because of its lightness, and for my part I would rather spend a few more pounds in putting in new gear once every five or six months than perhaps £100 in the same time in burst or worn-out tires.

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The Battery Question

THE advent of the new Edison storage battery, accepting reports of its performance to be true, gives the electric carriage additional points of merit. Lightening the storage battery, increasing its capacity or prolonging its life all add to its value as a practical means of driving automobiles, and with a battery that will stand a fifty or sixty-mile run without injury the electric carriage becomes a possibility for many more uses than at present. Ordinarily few of us care to make a run of over fifty miles, and for long-distance work a special battery can be used.

But there is another side to the question. Everyone admits the advantages of the electric carriage if it were not for the question of charging the battery and the deterioration which it too often undergoes. The final solution of the problem, it seems to us, is the discovery of primary battery elements which can be obtained as freely and as cheaply as gasoline, for example. Having these and a good primary battery capable of being renewed as easily as one fills his gasoline tank, the electrical problem is practically solved. The

mechanical part, *i. e.*, the motor, the transmission and the control, are mere details to be worked out, but the question of battery is the one which needs particular attention.

In brief, it is to the chemist or the worker in electro-chemistry that we must look for a solution of the problem. And it is evident that when the primary battery can be improved to the point suggested and the electric carriage made independent of the charging station, it will add greatly to the popularity of this type of machine.

The Dust Problem

NOW that the Summer is upon us with the prospects for a long dry season the dust question is one which forces itself upon automobilists. This is a matter which also affects pedestrians. Anyone who has driven in an automobile along the usual country road at anything like a fast clip knows how disagreeable and unpleasant is the dust usually stirred up. Even when mounted on a carriage, the body of which sits much higher than does that of a horse-drawn vehicle, the amount of dust which finds its way to the occupants is considerable. This dust problem is a very serious one, and demands the consideration of all interested in the welfare of the automobile as a successor to the horse.

No automobilist would think of taking anything like a long ride through the country without first seeing that the clothing he wore was especially fitted for keeping out the dust which accompanies the rapid motion of his vehicle.

The use of pneumatic tires, fast driving and exhausting to ground are responsible in a greater or lesser degree for this. Then, again, if there was no dust on the roads the trouble would not exist. The surest way to get around the difficulty would be to have roads which would be impervious to the tearing up by horse's hoofs. These, however, we do not yet have. There are a great many who now own and drive horses who will simply not adopt automobiles largely from the fact that their operation, along dust roads at least, means a dusty and begrimed appearance, rendering it necessary to always "wash up" before appearing in society. It is true much of the trouble would be removed if the desire to drive fast could be curbed. It is but natural for most of us, however, to "let her out" at times. We want to travel fast.

To those who are looking for carriages purely for pleasure this

dust problem is vital. In order to lessen the nuisance can some scheme not be devised by which the exhaust could be led away from the car in such a manner as not to stir up the dust? There can be no doubt whatever that the exhaust is responsible for much of the trouble. Manufacturers, it seems to us, would do well to give this subject more consideration than heretofore. With the introduction of the very deservedly popular high-powered gasoline carriage the trouble has rather increased.

An automobile enthusiast or one interested in the manufacture of motor vehicles might not consider the question as of much moment, but the great bulk of those who purchase automobiles merely want them as substitutes for the horse, and very readily take exception to anything which is likely to prove in the least disagreeable.

Grout Bros., Orange, Mass., builders of the "New Home" steam carriages, send us a catalog devoted to the illustration and description of their automobiles. These machines are light, speedy and economical in operation. Double-acting link-motion engines are used. Various styles of carriages are made by this company.

The Winton Motor Carriage Company, Cleveland, O., sends us a copy of their recently issued catalog in which are illustrated and described the automobiles of that well-known name. This company has for many years (so far as the automobile industry is concerned) been engaged in motor carriage manufacturing and their carriages are constructed with a view to supplying the needs of sensible and practical service. Illustrations of various styles of carriages together with views of the factory are given. The catalog is beautifully printed and is a decided contribution to automobile trade literature.

The Beardsley & Hubbs Mfg. Company, Mansfield, Ohio, send us copy of their recently issued catalog. The vehicles built by this concern are well designed, and various styles are included—stanhopes, cabs, breaks, etc. A very neat carriage they make is their combination stanhope, by the arrangement of which the front seat can be either closed or opened as may be necessary. This makes a very handy vehicle. Gasoline motors are used, and the finish of the carriage is of the highest character. A copy of catalog will be sent on application.

The "Tractobile"

A COMPANY has been incorporated with a capital of $2,500,000 for the manufacture of steam automobiles, called the Pennsylvania Steam Vehicle Company, whose headquarters are at Carlisle, Pa. Their steam vehicle is unlike any now on the market. They call it a "Tractobile," because the two engines, each with two cylinders, the generator and all necessary adjuncts, are carried on a steel tube framework and can be attached, as a whole, to any ordinary carriage in a few minutes. "It don't push, it draws," their advertisement runs.

Parts of the framework are two forks, with their heads, to which the steering device is fixed. The forks are each fitted with a wheel equipped with best quality pneumatic tire; these wheels are both driving and steering wheels. The forks serve not only as bearings for the axle of the wheel but are used as steam cylinders, the engines being of the double-acting inverted type, with the connecting rod attached directly to the crank axle, thus utilizing the whole of the power produced without loss from transmission.

In converting a horse-drawn vehicle into a motor vehicle the only thing required to be done is to remove the front wheels and axle and substitute therefor the motor framework with its wheels. The change can be made in a few minutes, and the "Tractobile" is interchangeable, that is, can be attached to different types of carriages.

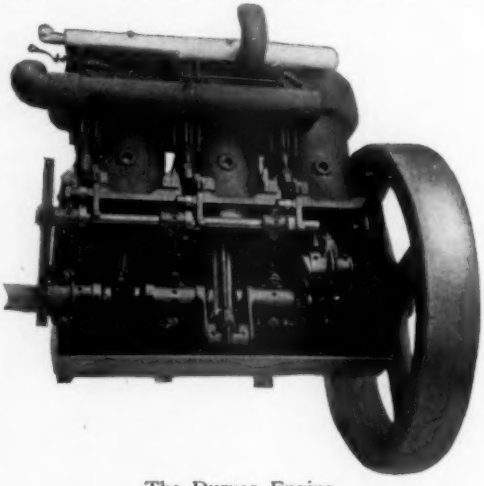
The shell of the boiler or generator is made of cold-drawn seamless steel tubing 5 inches internal diameter and is 18 inches high. It has forty ½-inch tubes running from end to end through the two heads, and the internal tubes and heads can be removed, as an entirety, from the shell in a couple of minutes, to allow of examination, cleaning or repairs. It can be as quickly reassembled. There is not a single rivet in the boiler. These boilers are units, and as many units are coupled up to form a battery or series as power needed demands.

The boiler, the method of its construction and the special tools used in building are patented throughout the world. Owing to labor figuring so cheaply in the production it can be supplied to the trade at a very considerably less price, power for power, than ordinary boilers, while the special advantages it offers will lead to a very general demand from steam carriage users. About 4 units are needed for a

stanhope, 5 or 6 for a 4-passenger surrey, and any desired number, according to load intended to be carried, for delivery van, etc. The shell as well as tubes is heated, and there is equal expansion and contraction throughout. Boiler makers can best appreciate the advantages of this unique feature. The automobile trade will be supplied with any of the company's specialties. The units are placed in a row or rows, or in one or more circles, as may be most convenient.

The Duryea Motor

IT gives us pleasure to present the accompanying illustration of the engine built by Chas. E. Duryea, whose name has so long been associated with the automobile industry. It was the privilege of the writer, a few weeks ago, to witness one of Duryea's four-wheeled phaetons race. The time it made on that occasion, especially when the condition of track was taken into account, was excellent and showed at least that the carriage possessed speed.



The Duryea Engine

In the Duryea carriages the weight is placed largely on the rear wheels, which it is claimed gives great ability in sand or on hills, and almost wholly prevents danger from side skidding.

The motor is shown with the crank case cover and oil cups removed. A single feed pipe crosses the extreme head of the motor, carrying gasoline to each cylinder, while a single exhaust chamber likewise crosses the top of motor. This receives gases from all cylinders.

The exhaust valve stems are fitted with radiating pins which carry off any excess of heat they may receive. The weight of the motor

complete is less than 200 pounds. The cylinders are 4½ x 4½ inches. This, it will be observed, gives a very light motor. These engines are not very high speed ; the builders claim about 1 horse-power for each hundred revolutions. At 600 this would give about 6 horse-power. Certainly slow speed is better for a motor and tends to much longer life than very high speed. Every part of these motors is sufficiently strong. They are compact and are so carried on the carriage as to be easy of access.

On annonce la très prochaine mise en vente, à la librairie Dunod, 49, quai des Grands-Augustins, à Paris, d'un ouvrage très important : *les Automobiles électriques*, par Gaston Sencier, ingénieur des Arts et Manufactures, et A. Delasalle, ingénieur-électricien, avec une préface de Charles Jeantaud, qui fut le véritable créateur de l'industrie des voitures électriques en Erance.

Ce nouveau livre, qui constitue le premier travail réellement complet sur une question encore peu connue, formera un beau volume de 400 pages, enrichi de nombreuses gravures.

Gaston Sencier est un des hommes de France qui ont le plus étudié les voitures automobiles et qui les connaissent le mieux. A. Delasalle a acquis une très grande compétence dans toutes les questions d'électricité. *Les Automobiles électriques* obtiendront donc certainement un très vif succès.

Espérons que nous aurons bientot une traduction en anglais de set ouvrage.

"Automobiling in the West." This is the title of a booklet just received at this office, a reprint from the *Cleveland Leader*. It describes in a highly interesting manner the experiences of Mr. Alexander Winton and his companion Chas. B. Shanks on their eventful attempt to make the journey from San Francisco to New York in an automobile. It contains a number of extremely interesting pictures taken *en route*, several of which are reproduced in our frontispiece, and to those who are not familiar with the condition of Western roads, or as the author puts it, "the utter absence of roads," this story ought to be of value. The incidents of the trip are written up very cleverly and the effort of Messrs. Winton and Shanks will, we feel sure, be productive of much good in calling attention more forcibly to the question of good roads. The author of the story is Mr. Shanks himself and he knows whereof he speaks.

The Kind of Accident that Often Happens

WHAT threatened to be a very serious horse runaway accident, happened on the recent run of the Automobile Club of America to Tuxedo. It was caused by a combination of circumstances, and was not in the slightest way the fault of the automobilists. The facts are as follows: Kenneth A. Skinner and the writer in a De Dion-Bouton motorette were running some distance ahead of other participants in the run, when, suddenly emerging from a place where nothing would be apt to be noticed a short distance in front, they saw a horse and buggy standing facing them about two hundred feet ahead alone in the middle of the road. An old lady was in the vehicle. The horse shied, quickly veered around, and tipped the buggy over, throwing the old lady out, luckily on to the soft grass in the ditch. Fortunately, the horse stopped for several seconds, pawing the air with his front feet as though he were surprised at the sensation of the carriage turning over and the shafts twisting and breaking on him. Also fortunately the automobile had traveled one hundred feet further, which brought its occupants to within one hundred feet of the wreck, enabling the writer to jump out, sprint and grab the horse's bridle just about as he had recovered his senses, so to speak, and started to bolt. The animal was so thoroughly frightened that it was as much as one man could do to hold him. The few seconds interim enabled Mr. Skinner to leave the machine, run up, and also grab the bridle. Several women ran out from the farm house opposite which the buggy had stood, and their hysterical shrieking made matters worse, tending to prevent the animal from being quieted. While the two men still held the pawing horse, the old lady was extricated from the wreck, and carried to the house piazza, and on the women leaving the buggy after a stern command to do so, the horse was at last quieted enough to enable one man to hold him while he was unhitched and led away several hundred feet and tied to a tree.

The automobilists then righted the buggy, but it was too much wrecked to be used. Other members of the run arrived at intervals, but there was nothing that anyone could do for the unfortunate owners of the buggy. The women were consulted with concerning the amount of damage they had suffered and Mr. George Isham Scott,

manager of the run, generously gave them the amount in cash, his action being prompted entirely by sympathy, for legally no one was to blame except the women who so foolishly left an aged lady alone with a horse, right in the middle of the public highway.

Had the horse been left at one side, without being tied, it would have been bad enough, for the old lady was not a fit person to handle the reins at any time. The women admitted that the fault was theirs, but on account of their helplessness it was a case which could not fail to appeal to any one. The legal standing of it would surely uphold the right of the automobilists to use the road. They were not traveling unusually fast, the machine was stopped as soon as danger was seen, and the occupants then personally did all they could to prevent a serious accident, for had the horse been allowed to bolt, the old lady would have been dragged on account of her skirts being entangled with the canopy of the buggy.

Taking the incident as a whole it may be described as being a good example of the average accident, for which automobilists are often blamed. It must be admitted that the horse was frightened by the approaching machine, but horses have often been frightened enough to run away by the approach of a woman with a white parasol. It was unfortunate for the women, for the carriage being wrecked delayed them until it was repaired, but considering how reckless it was on the part of the younger one to leave her aged companion alone, square in the middle of the road, they should congratulate themselves on the fact that no physical injury resulted and that they were re-imbursed for breakage which legally was caused by their own thoughtlessness.

M. W. F.

The initial run of the newly organized Automobile Club of Cincinnati, was held on Saturday, June 8. Thirteen vehicles formed in line in front of the club rooms on West Seventh St., and promptly at 2 o'clock started on the run. Howard S. Rogers acted as pacemaker and was followed by the President of the club, Reuben A. Holden and the following members: T. C. Meadows, Robert Burton, Howard Miller, Dr. Jos. Eichberg, Edw. Muhlhauser, Dr. G. M. Allen, Geo. Holly, Frank Miller, Rufus King, Jr., Col. Max Fleischman and Dr. L. S. Colter. The objective point of the run was Kenedy Heights, the country residence of President Holden, where refreshments were served. The return home was made at 5 o'clock. The club proposes to hold these runs every second Saturday during the season.

Notes from Abroad

PROBABLY many of our readers will be interested in the much-spoken-of 50 horse-power Napier cars which represented England in the recent Gordon-Bennett Cup Race. The nominal horse-power of these cars is fifty, and the brake eighty. The impact of explosion on each piston head is four tons. The total weight of the engine is 700 pounds. The driving sprockets each have thirty-eight teeth, while the chain wheels on driving wheels have but twenty-eight teeth.

Out of one hundred and fifty firms which exhibited at the recent Automobile Club Show, held in Great Britain, only five concerns exhibited electrically-driven automobiles, and only three of these confined themselves exclusively to electricity.

Before the Paris authorities a rather curious case is now being argued. It seems that Girardot in 1899 was one of the contestants in a race for a cup offered by Count Boyon de Talleyrand-Perigord. This race took place between Paris and Rouen. During the race it is alleged that Girardot drove his car at such a rate as to cause the horses attached to a military wagon to balk. It was claimed that the cause for the horses being frightened was the hooter, the question of speed having been relegated to a secondary place. The driver of the wagon received such injuries as necessitated his pensioning off. The Minister of War intends to push the charge even to the extent of claiming from those responsible the repayment to the state of the amount of pension paid to the injured man. If Girardot had not made his presence known by means of the "hooter" he would have been breaking the law, and it will be interesting to see just what the judges will say on the point of automobile drivers using their "hooters" even at the risk of frightening horses.

Results of Recent Heavy Motor Trials at Liverpool, England

A GREAT deal of very valuable work has been done by the Liverpool Self-Propelled Traffic Association, a branch of the Automobile Club of Great Britain and Ireland. This association has since 1898 been laboring with indomitable perseverance in the interest of heavy wagons for the transportation of heavy loads.

Liverpool is a city where one would naturally expect to find such efforts being carried on. It is the gateway to a large number of good sized manufacturing cities, including Manchester, which is but a little over forty miles distant. Up to the time when ocean vessels began to use the Manchester Ship Canal it was necessary that all the cargoes from the Atlantic steamships should be unloaded once, placed on railroad cars and carried to their destination and then unloaded again. Much of this freight went to Blackburn, Oldham, Burnley, Manchester, etc., all of which are less than fifty miles from Liverpool. Now a service of motor vehicles of large carrying capacity would be just the thing to cope with this work. The merchandise could be taken straight from the vessel and placed on these motor cars, then taken direct to where it is required.

The first trials by the organization referred to were held in 1898, when the number of entries was not large. These annual trials have each year revealed things that could not have been brought to light in any other way.

One thing which has characterized all the trials so far held has been the absence of the gasoline motor. This year's trials, held from June 3 to 7, saw the first internal combustion engines ever entered, and of these there were only two out of a total of twelve wagons. Both were entered by G. F. Milnes & Co., of London, and are built throughout on the Daimler system. The motor is carried in front, being covered by a suitable bonnet.

Wagons possessing some interesting features were those entered by the Mann's Patent Steam Cart and Wagon Company. These wagons are very ingeniously designed, the builders making them a blending of the traction engine and the motor van. The general appearance of these engines is decidedly like a regular traction engine. They are made in various styles and with different kinds of body suited to the work in hand.

The seemingly only practical vehicle for heavy work is that driven by steam, and the Englishmen up to this year have given their attention almost entirely to the steam engine.

We take pleasure in printing below a statement of the results of these trials and shall hope they will prove of interest and value. The first day was devoted almost entirely to the hill climbing trials. The hill selected for these trials was called Everton Brow. This is a very steep incline, as it was the writer's painful pleasure to have to ascend and descend it every day for about two years. Accord-

ing to the diagram published in the official program the hill was divided into five sections. The first of these showed a grade of 1 in 25, the second 1 in 17, the third 1 in 14, the fourth 1 in 13, while the fifth had a gradient of 1 in 9. The greatest interest centered in the gasoline motors and everyone was pleased with the excellent showing they made on their first appearance in these trials.

Below is given a summary of the hill climbing tests, the wagons being unladen. The gradient varied from 1 in 18 to 1 in 9 :

No. of Car.	Make.	Mean Speed. Miles per Hour.		Control on declivity 1 in 9. Distance run before coming to rest.	Speed in miles per hour at braking signal.
		Up.	Down.	Feet.	
A1	Milne (gasoline). . . .	3.77	4.27	16.5	6.01
A2	Milne (,,) . . .	4.2	5.18	51.5	10.81
B1	Leyland	3.29	3.58	19.4	5.34
C1	Thornycroft]	3.5	2.69	8.6	3.51
D1	Thornycroft	3.77	3.38	14.9	4.21
D2	Coulthard	2.97	2.38	6.5	3.58
D3	Mann tip cart	4.11	3.14	11.2	2.84
D4	Mann lorry	3.65	3.08	15.5	5.17
D5	Simpson-Bibby	2.75	3.86	25.1	5.33

The wagons were then loaded and again tested on the same hill with the result printed below :

No. of Car.	Make.	Load.	Mean Speed. Miles per Hour.		Control on declivity 1 in 9. Distance run before coming to rest.	Speed in miles per hour at braking signal.
		Tons.	Up.	Down.	Feet.	
A1	Milne	1½	3.24	4.26	1	2.80
A2	Milne	1½	2.61	4.13	26.4	5.68
B1	Leyland.	5	2.95	3.12	15.5	3.36
C1	Thornycroft . .	7	2.92	3.15	13.6	3.13
D1	Thornycroft . .	4	3.34	3.65	8.3	3.39
D2	Coulthard . . .	5	3.08	3.05	15.4	4.22
D3	Mann tip cart. .	5	2.96	3.03	14.9	2.66
D4	Mann lorry. . .	5	2.78	3.93	13.7	5.46
D5	Simpson-Bibby .	5	2.0	3.07	8.4	3.54

The second day was devoted to the carrying of loads between Liverpool and Manchester. The loads varied from 1½ to 6 tons carried by the large Thornycroft wagon.

It is a fact worthy of note that not one of the wagons engaged in the hill-climbing contest emitted any visible exhaust for more than

two or three seconds. Altogether the results this year show that genuine progress has been made.

This association deserves great credit for the good work it has done and is still doing.

Across France on a Racer

IN a recent number of *Motor Car Journal*, Mr. A. R. Sennett contributes an article which ought to be of interest to the automobilist, and we take pleasure in reprinting a part of this, as follows :

There cannot, indeed, be a shadow of doubt that motoring is a health-imparting pastime. What a contrast to traveling by train ! There it often happens that on emerging from a stuffy carriage, after a wearisome journey, one seeks for something to "tickle" one's carbureter—pardon, appetite. But your chauffeur, on descending from his "box"—pardon, *seige*—is in the mood to eat anything, if not everything that may be placed before him. In the good old coaching days, when St. Martin's-le-Grand was alive with fours-in-hand and eleven-mile-an-hour stage coaches, there gazed down upon them a smiling face with enormous mouth, protruding in bas-relief from the grimy walls of the great coaching hostelry. This mouth surmounted the legend :—

Milo, the Cretonian,
An ox slew with his fist ;
And eat it at one meal.
Ye gods ! What a glorious twist.

Perhaps a day will come when such another, but motor, holstery shall rear itself at the Arthur Balfournian center, and which shall bear this superscription :—

Rollo, the Chauffonian,
An ox slew upon the *piste*,
And eat it for his dinner—the sinner.
Dieu, motorists ! What a glorious twist.

Perhaps that which is most intimately connected with the chauffeur's health is his clothing. At first sight this might appear a matter of small importance, but really it is one which may fairly command space for discussion by those actually conversant with motoring at high speeds. Already quite a small industry is springing up in fulfill-

ment of the chauffeur's requirements. What these are is open to discussion, what he should not use is more obvious. He should certainly not don anything in the nature of a loose garment such as an overcoat or impermeable having a loose cape which may blow over the face and cause an accident. Besides, such loose things are very wasteful in buttons, for few will be left after the first 100 kilometers. The wind at sixty miles per hour—which we believe Jack calls a stiff gale—has to be experienced to be appreciated. It reminds us of that to which he referred when he said, "The wind it blow'd so 'tarnationly hard, it blow'd three teeth out o' the carpenter's saw and took six men to hold the cap'n's wig on." Trousers, too, are far from suitable nether garments, acting, in fact, as forced-draught pipes. We consider, then, that trousers should not be worn ; nevertheless, it would be advisable to wear something in place of them. Laced boots also are unsuitable, and so is any form of headgear presenting a greater vertical surface than is absolutely necessary to the wind. Starched collars are unsuitable, and are also difficult to find at the end of a wet run, when they assume the appearance of a roll of brown linen round the lower part of the neck. The collar, however, will probably die hard, and we observe that some chauffeurs are taking to "spitters" as a compromise—*i. e.*, celluloids, which may be expeditiously and economically washed, with a very small volume of water, en route. Celluloid—otherwise guncotton—should obviously be used sparingly ; and certainly the transparent "celluloid" or "xylonite" guards intended as preservatives of ladies' complexions should not be had recourse to. Shirt cuffs should not be worn, for, like the Irishman's flea, when you go to put your hand upon them they're not there, you find there only an accordion-plaited—accordin' to its fancy—tube of limpness. Moreover, chauffeurs' shirt cuffs become chameleons, for it is astonishing how marvelously they change color after "visiting" the motor. The cuffs of coats also should be specially constructed to prevent the "weather" blowing up the arms. This can be done in two ways, by a buckle and strap at the wristbands, or by—and which is preferable—a false sleeve and strong elastic "gathering" worked in under the outer sleeve.

With regard to the material, we feel that the old English adage, "nothing like leather," applies perfectly in this case for ordinary wear, while for cold and bad weather nothing can compare with nature's own *vêtement*—viz., the skin with the fur left on ; something with good long hair, such as bear or raccoon, which is capable of efficiently throwing off both dust and rain.

Were we asked our opinion of what the automobilist's costume should be, we would say that for ordinary driving, especially with ladies, it should be as nearly as possible that of a gentleman driving his carriage and pair. A well-appointed automobile never looks so well as when it is garnished with well-dressed women, its driver turned out in much the same "rig" as he would appear on the box of his four-in-hand. For high speed motoring, however, we consider that the best costume would consist of a casquet, a pilot jacket, and knickers, all in leather, and preferably of a lightish brown color, which is cooler and which will serve as a distinction between the amateur and paid chauffeur. The knickers should be provided with rather deep continuations and should be full at the bottom. The "get up" would be completed by top boots—probably brown in color, of such height that they would come well up beneath the overlap of the knickers. Motor top boots should be made upon the "puttee" plan, that is to say, with a spirally-arranged strap, so that they may be made to fit tightly around the calf.

The cap should be of dull leather with a wide enameled peak and it should not have holes in the front, as some have, through which the air rushes and balloons the crown. The strap should not be of enamelled or patent leather with sliders, as is usual, since these are quite useless; the slippery patent leather slackening and causing many a well meaning cap to lose its head. In place of the sliders a buckle should be used, and in order to allow for a certain amount of give-and-take the straps should be fixed to the cap through the intervention of a short length of elastic material. It may be an advantage to be elevated at once to a Grand Duke, if not a Czar, by donning a cap of beetling proportions; but the automobilist will find that size in this regard is a disadvantage. For bad weather we think there is nothing to supplant the long-tried Sou'-Wester, but this should not be of oilskin, as it takes too much room when stowed away. It should be of flexible mackintosh, helmet shaped, and we find an advantage in having the chin tapes attached to the Sou'-Wester at the hem of the lining and not sewn on to the ear guards; by this means the latter may be pushed up into the crown when not required, and one's hearing thus facilitated.

With regard to gloves, these require to be much stronger than those of the usual di ettanti type, and the most comfortable are those furnished with gauntlets. One other article of great utility, if not of attire, should be referred to, viz., the goggles. These should be

carefully designed, and care should be taken to note that the valence is not so long that if it blow up over the glasses vision would be obscured, as this might lead to accident. Also this valence, which is intended to protect the face from the sun as well as from the impact of sharp particles, should be supplemented with a nose guard, for it is upon one's proboscis that "barking" takes place to the most annoying degree. The reminiscence of the red flag before one's eyes is sufficiently tantalizing without one carrying a danger signal on one's very nose. We are very adverse to the wearing of goggles of thin glass, which we consider dangerous, from the fact that a small pebble may break them, possibly with serious result ; therefore they should be of stout glass, and also decidedly convex, to prevent the eyelashes bearing upon them.

Another permanent event has been decided upon by the governors. It is embodied in this resolution, which was recently adopted :

"Resolved, That the Automobile Club of America organize, subject to the consent of the local authorities, an annual race for the mile record, the date and the course to be selected by the committee on races, the course to be properly policed and guarded ; entries to be made for steam, gasoline and electric carriages in separate classes ; that the entrance fee be $10 ; that the club appropriate $600 for the purchase of three cups, one for the winner in each class."

On account of there being some confusion about the two committees of the A. C. of A. appointed to manage automobile events associated with Buffalo this season their make-up is given : Endurance Test from New York to Buffalo from Sept. 9 to 14, W. M. Power, chairman, Winthrop E. Scarritt, Harlan W. Whipple ; Automobile Events at Pan-American Exposition from Sept. 16 to 21, Albert C. Bostwick, chairman, Dr. Truman J. Martin, John Aspinwall, J. C. McCoy.

The Automobile Index

Everything of permanent value published in the technical press of the world devoted to any branch of automobile industry will be found indexed in this department. Whenever it is possible a descriptive summary indicating the character and purpose of the leading articles of current automobile literature will be given, with the titles and dates of the publications.

Illustrated articles are designated by an asterisk (*).

***Air-Cooled Motors—**

An article by C. G. Wridgway, in which he makes some interesting statements regarding air-cooled, high-speed motors. "Automobile Magazine," June, 1901.

***Automobile, The Final—**

By Hugh Dolnar. Part V of a series of articles in which the author sets forth what in his opinion the automobile of the future will be. In this article he takes up the matter of frame and running gear. "Automobile Magazine," New York, June, 1901.

***Battery, The New Edison—**

An exhaustive description of this battery written by Dr. A. E. Kennelly. Contains curves of discharge of the cell. To those at all interested in the storage battery this article ought to prove valuable. "Electrical Review," New York, May 25, 1901.

***Brake, Cuenod's Emergency—**

This is a novel form of brake. In addition to being used as a brake it can be used as a lifting jack for facilitating cleaning or repairing of wheels. "Automotor Journal," May, 1901.

***Breaker, The De Dion Contact—**

This article is devoted to a consideration of the action of the trembler as used on the De Dion motors. "Motor News," Dublin, 1901.

***Carbureter, The Blake—**

The noticeable feature of this device is the absence of the usual float feed. When making the suction stroke a partial vacuum causes a flexible diaphragm to rise, permitting gasoline to escape through a nozzle, when it is carried to the explosion chamber. At the end of stroke the diaphragm returns, by which it pumps a jet of petrol through nozzle. The inventor has used this form of carbureter very successfully for some time past. "Motor Car Journal," London, May 25, 1901.

***Cylinder, Piston and Packing Rings—**

By L. Berger. A highly instructive article taking up the subject of correct practice in the boring of cylinders, fit of piston and rings, etc. "Horseless Age," New York, June 5, 1901. (See under Piston.)

Electric Carriages, Operation of—

H. M. Underwood. Contains some very useful information for those who own or are contemplating the purchase of electric vehicles. "Automobile Magazine," New York, June, 1901.

***Gasoline Motors, Cooling of—**

Description of the Lombard system of cooling. This is accomplished by injecting into the cylinder a small quantity of water. "Automobile Magazine," New York, June, 1901.

***Heavy Vehicles, Trials of—**

Full descriptions of the various cars which competed in the Liverpool trials. "The Autocar," June 1, 1901.